

ANNALS
OF
SURGERY

A MONTHLY REVIEW
OF SURGICAL SCIENCE AND PRACTICE

EDITED BY
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AND
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VOL. I.

January—June, 1885.

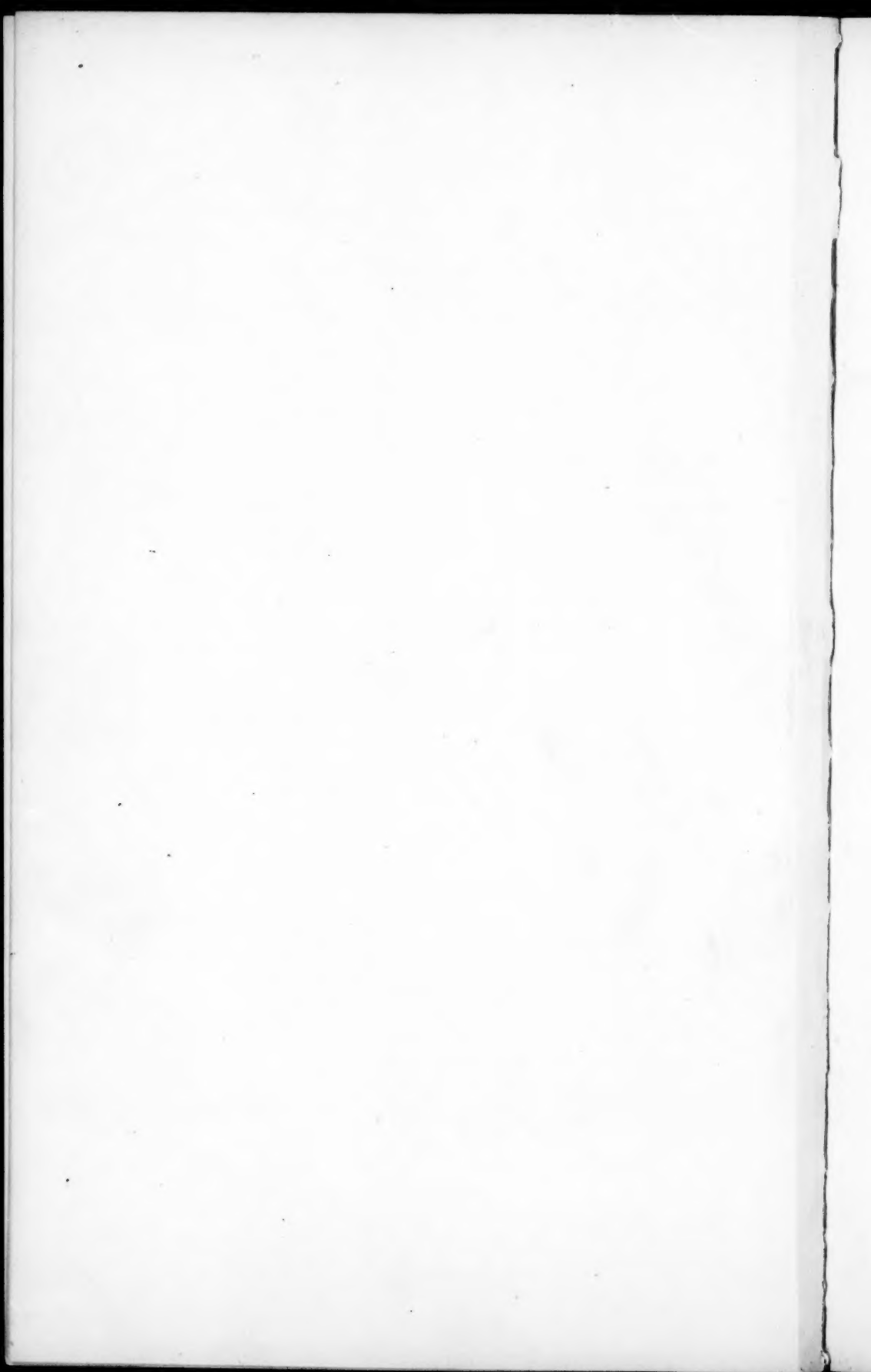
ST. LOUIS:
J. H. CHAMBERS & CO.,
1885.

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ANNALS OF SURGERY.

ON REMOVAL (BY SCRAPING OUT) OF THE MARROW OF LONG BONES, AND ESPECIALLY ON THIS PROCEEDING AS A TREATMENT OF OSTEO-MYELITIS. ALSO ON THE SAME FOLLOWED BY THE LOCAL APPLICATION OF CORROSIVE SUBLIMATE SOLUTION AND OF IODOFORM.

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I WISH to call attention to the ease and safety with which the operation named in the title of my paper can be effected, even when applied to the whole shaft of a large bone like the femur.

That the marrow is not essential to the life of a bone, is proved by such facts as that certain bones of birds have no marrow, and that, as the experiments of Maas shewed, not only can bones live without marrow, but, when fractured, they unite just as well if deprived of it as if left in the normal state. I believe, also, that among Ollier's numerous observations are some proving the same truth.

Concerning the safety with which considerable cavities can be washed out, for antiseptic purposes, with a solution of corrosive sublimate, of strength 1 in 1000, there are now many cases recorded, especially in the experience of Schede and Kümmell, of Hamburg. The liquor hydrarg. perchlor. (P. B.) is, in strength, 1 in 960, which is practically about 1 in 1000.

In the Autumn of 1883, a boy, aged 15, was in the West London Hospital under my care with an opening discharging in the middle of the right thigh towards its anterior and internal aspect. From this opening, sinuses burrowed both upwards and downwards. Having enlarged the opening considerably and explored these sinuses, which led to the immediate neighborhood of the shaft of the femur, I failed to find any necrosed or bare bone, nor was there any definite sign of hip disease. There was a slightly limited *range* of motion in the hip, but what remained was perfectly free. There were also general tenderness and thickening of the whole thigh. The first symptom said to have been noticed was a slight limp six months before. The patient then complained of pain in the middle and lower part of the thigh. The next prominent sign to attract notice was a swelling in the region just mentioned, which fluctuated and was eventually opened, leaving the sinuses above referred to. On September 8, I found the hip-joint much stiffer than formerly and a complaint of pain in the knee. I had ether administered, and found that the hip-joint surfaces grated when rubbed together. I opened the joint from behind; pus escaped, and the head of the femur was seen of normal shape but bare of cartilage. I proceeded to scrape the surfaces with a Volkmann's spoon. In the manipulations necessary to make different parts of the joint accessible (which manipulations were conducted most gently) the shaft of the femur snapped in two. Now a former exploration had told me that the extensive sinuses existing burrowed up and down and around the shaft of the femur. The fracture was therefore necessarily compound. Moreover, there had always been a suspicion of chronic osteo-myelitis in the case. The accident somewhat tended to confirm the suspicion, although, of course, the bone might have been simply atrophied from want of normal use. I made a sufficiently free longitudinal incision on the outer aspect of the thigh, right down to the fracture,

having previously made the limb bloodless by elevation and an elastic tourniquet. The fracture was curiously oblique. The periosteum was stripped off the outer aspect of the femur for about six inches, but not permanently displaced. The medullary cavity was filled with a dark and granular material more like broken-down granulations than normal, oily marrow. I scraped it out of the whole length of the shaft, from one epiphysis to the other. I then made an effort to render the cavity of the femur, the old sinuses and the hip-joint, aseptic, by injections, firstly, of liquor hydrarg. perchlor., secondly, of concentrated ethereal solution of iodoform. A modified antiseptic dressing was employed, such as could be easily changed, when necessary, without disturbing the fracture. Drainage tubes were inserted in each opening, and deep and superficial sutures into the incision by which I had reached the fracture. Over all were laid kettle-holder splints. A weight extension was used. There was very little after-pain. The hip-joint and old sinuses suppurated; but the femur united in due course. The patient was improving in weight, health and spirits, the discharges had long diminished to a very small quantity indeed, when he was seized with ominous pain in the head, rapidly developed the characteristic symptoms of tubercular meningitis, and died of that disease, as a post-mortem proved.

The shaft of the femur was found with the fracture healed throughout with firm osseous union, apparently quite healthy and certainly free from necrosis. The hip-joint was commencing to ankylose, that is to say, about half the head of the femur was united by cicatricial tissue to the acetabulum. The remainder of the acetabulum was bare and rough.

The next case is that of Thomas Higgins, aged 20, also an in-patient of the West London Hospital. He suffered from total disorganization or rather destruction of the knee, which had commenced by an abscess in the head of the tibia, breaking into the joint, and which had led to well marked osteomyelitis of the lower half of the shaft of the femur. The limb was riddled with sinuses, from the ankle to the thigh. I advised him to let me operate on it, and to give me leave to amputate if, upon examination under ether, it should appear desirable to do so. He consented to an operation, but not to amputation. On January 4 last I excised the knee, removing

the condyles of the femur until the medullary cavity was seen—full of pus. I scraped out the lower half of the shaft of the femur, and injected it first with liquor hydrarg. perchlor., secondly with ethereal solution of iodoform. I then sutured the femur to the tibia. In order that the discharge from the hollowed out end of the femur might not cause the dressings over the knee to require disturbance, I trephined the femur on its outer surface, about midway between the great trochanter and the knee, and inserted a drainage tube there. It is unnecessary to describe the after course in detail. But, on Feb. 15 (the twelfth day after the operation), I was summoned to find the patient blanched and all but pulseless from secondary hæmorrhage. I had been unable to make the limb and wound aseptic, mainly, I believe, because of the numerous, complicated and extensive sinuses. I at once amputated, performed transfusion, and had the pleasure of seeing him recover.

In the course of the twelve days no change had apparently taken place in the hollowed out lower half of the shaft of the femur.

The third case is that of Frances Markwick, aged 19. Syme's amputation had been done some years before, for, according to the patient, "disease of the foot." Sinuses had always remained, and were now present. The stump was exquisitely tender, and the patient excessively timid and sensitive. On Feb. 8, under ether and with the limb Esmarched, I cut down upon the end of the tibia in the stump, and found it roughened, bare of periosteum and very soft. The abnormal condition extended for at least three inches, and throughout the whole substance of the bone. I amputated, removing about four and a half inches of the tibia and the corresponding part of the fibula. The medullary cavities appeared abnormal, indeed the bones presented the appearance of two slender and empty cylinders, which had contained a thin fluid, allowed to flow out by the section through the bone. As these cylinders had been in direct contact with the carious bone removed, I scraped them out gently right up to the upper epiphysis of the bones, and then washed them out with liq. hydrarg. perchloridi.

I did this amputation after Neuber's method, now practiced

by Esmarch, preserving flaps of periosteum, and suturing separately, each to each, with strong catgut, (1) the periosteal flaps, (2) the muscle flaps, (3) the skin flaps. Healing took place rapidly, and from the first the patient was little, if at all, affected as regards appearance, appetite, pain, etc.

Bleckwenn has reported a case of chronic osteo-myelitis of the humerus, in which he resected the head of that bone, trephined the shaft, scraped out the marrow, and passed a drainage tube right through. The patient recovered with a useful arm, only a small fistula remaining at the date of the report.¹

And Stoll relates six successful amputations through bones affected with suppurating osteo-myelitis, in which he scraped out the diseased medulla and filled the cavity with iodoform, thus avoiding the necessity of disarticulation at the joint above. The *précis* writer in the *Centralblatt für Chirurgie* (1883, No. 49) says that Stoll's communication confirms the observations of Bleckwenn, König and Küster, to the effect that exarticulation is at least superfluous in similar cases.

Eight more amputations in which the marrow of the bone of the stump was scraped out, on account of osteo-myelitis, are recorded by Petrowski.² In all these the cavities were filled up with iodoform, and a perfectly good result ensued. The same author suggests the employment of this plan in gunshot wounds, as a prophylactic against osteo-myelitis, so frequent and so fatal when the long bones are hit.

Stoll appears to have been working independently, as indeed I was; and the fact that several surgeons should, unknown to one another, have been getting and recording exactly similar results, goes far to confirm the value of the observations. Indeed, this development of conservative surgery is one of the natural and inevitable results of that antisepticism which is now transforming our art.

These cases prove to demonstration the safety with which the medullary cavity of a long bone can be opened, scraped out, drained, and treated locally by powerful germicide drugs. The proceeding is followed by little or no pain or constitutional reaction, or danger to the life of the bone, in fact, quite the contrary.

¹ *Deutsche Zeitschrift f. Chirurg.*, 1882, Bd. xvii., Hft. 3 and 4.

² *Centralblatt f. Chirurgie*, March 8, 1884.

I do not go so far as to say that disarticulation will henceforth be always superfluous in cases of osteo-myelitis. That will depend, in each case, on the presence of complications. Nor do I ignore the fact that limbs have often been saved wherein osteo-myelitis of a diaphysis has been allowed to run its course without any operative treatment whatever. Nor am I doubtful of the value of simple antiseptic trephining, or of the same combined with drainage, as recommended by Lannelongue.

Still, it cannot be denied that in a large number of cases the indications are to remove the diseased tissues thoroughly, and I hope it will be recognized as a distinct advance in surgery that the possibility is now clearly proved of accomplishing this object without removing the bone or the limb.

I will conclude with a few practical observations:

1. In the face of Schede's observations as to the dangers of using iodoform too freely, and on the occasional existence of idiosyncrasy with regard to that drug, I should hesitate to imitate the surgeons who fill the medullary cavity with it. Moreover, my own cases show that it is superfluous to do so.

2. If the shaft of a long bone cannot be thoroughly scraped out through a lateral hole, the bone may be completely divided, and yet speedy and thorough union reckoned on. The experiments of Maas on animals, above referred to, prove how unnecessary is the preservation of the medulla in order to secure union of fractures. And one of my own cases, the first, proves that the same law applies to the human subject.

TREATMENT OF WOUNDS OF THE ANTERIOR TIBIAL ARTERY, COMPLICATING COMPOUND FRACTURE OF THE LEG; WITH REPORT OF A CASE.¹

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J. F., aged 50, native of France, quarryman, on the 19th of January, 1884, whilst at his work in the quarry, was struck on the right leg by a large stone, which fell from some distance above him. He was immediately brought to Hospital, where on examination it was found that he had sustained a compound fracture of both bones of the right leg, about the junction of the middle with the upper third. The wound in the soft parts was situated on the front of the leg, and extended from one inch below the tubercle of the tibia in a direction downwards and outwards. The fracture of the tibia was oblique, the upper fragment overlapping the lower; the fibula was fractured higher up through the neck. When the man was admitted, his leg was enveloped in a tight bandage, on the removal of which very free bleeding took place; this was easily controlled by sponge pressure. The wound was washed out with a solution of carbolic acid 1-40, and the limb was encased in plaster bandages, an opening being left opposite the wound. The wound was dressed with iodoform and antiseptic gauze, and a carbolized sponge placed over the layer of gauze, and firmly kept in position by an evenly applied antiseptic bandage. By this means the hemorrhage was almost completely arrested,

The next day, owing to the free oozing of blood, the dressings had to be renewed. After this there was no more oozing, and the case went on well till the fourth day, the temperature never having risen above 99° F. On January 23, the man complaining of uneasiness and a throbbing sensation, the dressings were removed, and at the site of the wound, which had become closed by blood clot, a pulsating swelling, about the size of an egg, was seen. From the situation of the swell-

¹Read before the Canada Medical Association, August, 1884.

ing, and from the fact that the posterior tibial could be felt pulsating behind the internal malleolus, I concluded that I had to deal with a laceration of the anterior tibial artery.

Next day the pulsating swelling had markedly increased, so, after consulting with my colleagues, I decided to cut down and tie the anterior tibial artery at the site of the injury, if possible. On removing the plaster bandage, the leg was found to be much swollen and congested. The man having been placed under ether, and an Esmarch bandage having been applied, I enlarged the wound on the front of the leg till it was between three and four inches long, turned out the blood clots, and began my search for the injured vessel. I had originally intended performing the orthodox operation of cutting between the tibialis anticus and extensor longus digitorum muscles, but owing to the torn and infiltrated condition of the muscles, this I found to be no easy task, so I then endeavored to reach the artery by increasing the separation which already slightly existed between the tibialis anticus muscle and the bone. Separating the muscle carefully, I soon came upon the interosseous membrane, and a little later made out the anterior tibial nerve, with the artery to its inner side. The injured portion was then searched for; by carefully tracing the artery from below up and occasionally relaxing the Esmarch bandage, it was found, to be almost immediately in front of the place where the vessels pierced the interosseous membrane. Fortunately the artery was not completely torn through, for, no doubt, had it been it would have retracted through the opening in the membrane, and ligature of it would have been impossible. The site of the wound in the artery was discovered with the greatest difficulty and after considerable time was spent in the search, for, owing to the depth of the wound and the darkness of the day, but little could be seen, until with the aid of a lamp and throat mirror the parts were tolerably well brought into view. Ligatures were now placed above and below the bleeding-point. The upper ligature, owing to want of space, was applied with the greatest difficulty, and after several failures. Carbolized Chinese silk was used, because it was more easily manipulated and could be tied with greater security than catgut. The vessel having been secured, the Esmarch bandage was removed, and it was now seen that the hemorrhage was completely arrested.

The fracture of the tibia was then attended to; about half an inch of the lower end of the upper fragment, which had a tendency to protrude and was completely denuded of periosteum, was cut off, and the two fragments of the tibia brought into accurate apposition by a strong silver wire suture. A rubber drainage tube was passed into the wound and brought out at the most dependent point at the outside of the leg,

in front of the fibula, to ensure thorough drainage. The wound having been washed out with carbolic acid 1-40, and dusted over with powdered iodoform, was closed with catgut sutures, and dressed as before with iodoform gauze and borated cotton; the leg was then put in a McIntyre splint, and kept in place by a bandage.

For two days after the operation the patient had some elevation of temperature — 101°-102° F. On January 26, some staining of the dressings appearing, they were removed. The wound looked well, the lower part suppurating a little. Two days later the discharge was very profuse, and pus had burrowed almost as far as the ankle between the skin and fascia. This was apparently caused by the breaking down of the blood clot produced by the bruising at the time of the accident. Free incisions were made, and drainage tubes inserted, and the burrowing of pus was thus arrested. By the 3d of February the wound was suppurating freely, the stitches had given away, and bare bone could be seen and felt through the wound. The wound had always been sweet, and the temperature, after the first three days, had never reached 100° F. Owing to the profuse suppuration the dressings were changed every other day, and the wound washed out with 1-40 carbolic acid solution.

The following note was made on February 15: "Patient going on well; discharge much lessened, some large shreds of sloughy fascia having come away from the deeper parts. The bare bone is becoming covered with granulations. The silver wire which united the broken ends of bone gave way some days ago, but is still holding a little, and helps to keep the fragments in position. Temperature for the last week has been 100° F. at night, and 98½° F. in the morning. Appetite fair, and general condition good. Takes a pint of claret daily."

From this time the case progressed most favorably, and the temperature soon became perfectly normal. For some time there was free suppuration, and many sloughs of cellular tissue came away, as did also several pieces of dead bone.

On March 15 the silver wire was removed, and the drainage tubes were dispensed with, only a small sinus being left at the site of the old wound, through which some bare bone could still be felt. Several small pieces of dead bone came away on the 30th of March, and also one of the silk ligatures which had been placed on the anterior tibial artery. There was now firm union of the bones.

The man was about on crutches early in April, and seemed to be going on well, when, crossing the ward one day, he slipped, fell and re-fractured his tibia. He was immediately put to bed, the splint re-applied, and the wound, from which there was a good deal of bleeding, dressed as before. The leg now became much congested, swollen and painful, but in a day or two these symptoms subsided.

By the end of May the bones had again united, and although there was still a small sinus, no bare bone could be felt. He was discharged from Hospital June 28, 1884. When seen in July, he was walking about with a stick. The wound in the leg had completely healed, and he said that he could walk a mile without much difficulty, and that his condition was improving daily.¹

Ligature of the anterior tibial artery is an operation which is rarely called for. The low operation is comparatively an easy one, but the high operation, owing to the depth at which the vessel is placed, presents many difficulties, and is rarely performed except on the dead subject. In the case narrated above, the great depth of the vessel, and the narrowness of the space in which it lay, as well as the infiltrated condition of the neighboring tissues, made the operation a most tedious and difficult one, but, on the whole, fewer difficulties were encountered than I expected. As I remarked in narrating the case, I was unable to satisfactorily follow the line of division between the anterior tibial and long extensor muscles, so reached the vessel by separating the anterior tibial muscle from the bone; in this way the artery was easily seen, and the advantage of having one side of the wound bounded by bone and thus, so to speak, fixed, was evident, for, only one retractor being necessary, more room was obtained.

Laceration of the main arteries in the leg, due to fracture, is not a common injury. Dupuytren, in twenty-three years, saw seven cases of diffuse aneurism due to fracture of the leg, and advocated ligature of the femoral, in preference to amputation, in such cases. This procedure Dupuytren advocated in fractures, both simple and compound, where the artery was wounded and a diffuse aneurism had formed.²

Erichsen (Vol. I., p. 252, 2d ed.) says: In most cases it is not practicable to carry out the instructions of some surgeons, to enlarge the wound and attempt to tie the artery where it has been injured, as the surgeon would have to grope in the midst of bleeding and infiltrated tissues, and would experience the greatest possible difficulty in finding the wounded vessel,

¹The patient was exhibited to the members of the Association at the August meeting.

²Mr. Guthrie (*Wounds and Injuries of Arteries*, 1830) strongly condemns the proceeding of Baron Dupuytren, and insists on ligature of the vessel at the injured point. John Bell (*Principles of Surgery*, Vol. IV., 1826) advocates the same practice.

after a search which would materially tend to increase the disorganization of the limb. If pressure fails, and the artery wounded be deep, he advises immediate amputation.

Frank Hamilton says very little about wounds of arteries in fractures; he merely remarks (p. 69, 6th ed., 1880): "Ruptured arteries, if within reach, ought always to be tied; and if arteries situated remote from the surface bleed freely and for a long time, we may make some effort to find the open mouths in the wound; but in this we rarely succeed, nor is it safe generally to trust to the ligature of a main branch which supplies the part. Fortunately, this bleeding, although at first profuse, generally ceases in a few hours under the steady employment of cold lotions, moderate compression and rest. If it does not, the chances are the case will call for amputation."

Agnew (*System of Surgery*, Vol. I., p. 997), in speaking of hemorrhage in fracture of the leg, says: "If it is at the upper part of the leg, and the bleeding is persistent, we have but one recourse—amputation."

In rupture of the tibial arteries in simple fractures of the leg, Mr. T. Holmes (*System of Surgery*, Vol. III., 1883, p. 86) does not advise surgical interference, and says that, as a rule, these cases do well if treated by position, rest, and light and even compression. In compound fractures he lays down the general rule that the wound must be enlarged, and the wound of the vessel treated, irrespective of the fracture.

Petit, in a case of simple fracture with wound of the anterior tibial and the formation of a traumatic aneurism, cut down and successfully tied the bleeding vessel.

Verneuil, in 1859, made use of a different method of treatment; he compressed the femoral on the pubis by the finger and with bags of shot. The successful case reported by him was rupture of the anterior tibial with simple fracture of the bones.

Vallette obtained a good result by the same means in a case of compound fracture of the leg with wound of the artery.

In cases of simple fracture with wound of the artery, rest, position, even pressure, and, if this fails, compression of the femoral are, no doubt, the best means to first employ, a compound fracture being thus avoided. Many successful cases have been reported where there was no surgical interference.

When, however, there is already an external wound communicating with the fractured bone, it seems to me that the simplest, surest and best practice, especially in these days of Esmarch's bandage and antiseptic surgery, is to enlarge the wound and search for the bleeding-point, as I did in my case. If we delay, the chances are that the limb will have to be amputated. Compression of the main artery, in a limb whose vitality is already impaired by severe injury, offers no special advantages, delays union, and may lead to serious consequences. Dr. Lidell, in his valuable article in the *International Encyclopædia of Surgery* on "Injuries of Blood-vessels," tabulates sixteen cases of wounds of arteries of the leg treated by various methods. In three cases ligature was applied to the wounded vessels, and two died. In three cases where compression of the femoral was employed all recovered. The cases of ligation, however, were before the days of antiseptic surgery, so Dr. Lidell's condemnation of ligature in these cases does not hold.

Had I to treat a similar case, I should employ the same method as being the most direct and certain, and quite as safe as any other.

NOTE.—Since writing the above I have seen another case of rupture of the anterior tibial artery. This occurred in a patient in the Montreal General Hospital, under the care of Prof. T. G. Roddick, to whom my thanks are extended for the courteous manner in which he has allowed me to make use of this case.

The case was one of injury received while coupling cars. There was a simple fracture of both bones of the leg, high up, and when patient was admitted into Hospital, two days after the accident, his limb was enormously swollen, discolored, painful, and cold in parts. The swelling fluctuated freely, especially below the knee. The posterior tibial artery was felt pulsating behind the internal malleolus, but the anterior could not be made out. The swelling increasing rapidly, and the general condition of the man being unfavorable, Dr. Roddick, though suspecting rupture of the anterior tibial artery, wisely decided on amputation, because of the obscurity of the case, and the unfavorable condition of the limb, which was gangrenous in parts. The limb was removed, and the man recovered without a bad symptom. On examining the amputated limb it was found that there was complete rupture of the anterior tibial vessels where they passed through the interosseous membrane; the upper end of the artery had retracted through the torn membrane, and was found, only after a careful search, imbedded in infiltrated muscle; the lower end was some two inches distant from the upper. There was an oblique fracture of the tibia at the junction of the middle and upper third, and fracture of the fibula through its neck. The vessels had evidently been ruptured by the tearing of the interosseous membrane, and were clearly not injured by the fractured bones. Had ligature been attempted in this case, failure to find the upper end of the wounded vessel would have resulted, and amputation would have been necessitated under much less favorable circumstances.

AN INQUIRY INTO THE ORIGIN OF THE USE
OF THE LIGATURE IN THE TREAT-
MENT OF ANEURYSM.¹

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BYTERIAN AND BELLEVUE HOSPITALS.

AMONG the many great advantages modern methods of treating wounds have conferred upon the art of surgery, one of the greatest is the security they have given to operations upon the arteries. They have made it possible to tie the principal arteries of the limbs in continuity with almost absolute security against secondary hæmorrhage, and with greatly diminished risk of causing gangrene. They have almost entirely done away with, or have relegated to the class of exceptions, that host of alternative methods by which for a century surgeons have sought to replace the ligature in the treatment of external aneurysms. It has become so safe to tie the femoral artery, for example, that the surgeon who, in an ordinary case of popliteal aneurysm, should resort to that operation in preference to any other method, would not be deemed indifferent to his patient's best interests, or thought to have exposed him to any serious risk which might have been safely avoided. The efficiency, promptness and painlessness of the method would be accepted as a complete equivalent for the advantages peculiar to such rival methods as digital pressure or the use of the elastic bandage.

Such being the case, the question of priority in the introduction of the ligature gains in interest, and it is to that question that I ask your attention—a question that has been made to turn, not upon the simple fact of priority in the use of the ligature (concerning which there is no obscurity), but rather

¹ Read before the New York Surgical Society, October 14, 1884.

upon the motives, principles and knowledge that guided those who first used it, and who established the method. The facts are as follows:

On the 30th January, 1710, Dominique Anel, a French surgeon practicing in Rome, operated upon a priest for a very large aneurism of the brachial artery at the bend of the elbow, caused by an unskillful venesection; he exposed the artery above the tumor, and tied it as close to the latter as was possible; the patient made a good recovery.

The report of the case provoked much discussion, and a spirit hostile to Anel and to the new method showed itself in the country of his adoption, and it was charged against him, with a variety that testifies to the ingenuity of his detractors, that the case was not an aneurysm, that he had not cured it, and that the cure was only by a lucky chance. Against the first two charges he brought the written testimony of other surgeons who had seen the case; and against the third he offered arguments which show his correct apprehension of the manner in which the operation effects a cure. He says: "I did not touch the sac at all, not doubting that the blood would leave it, since the way was open for it to pass down the limb, and that the sac, once emptied, would not refill; that the tissues of the membranes which formed it would not fail to shrink, and that thus the tumor would disappear; which did not fail to take place as I had expected."¹

The case, together with his reply to various criticisms, was published by Anel in 1714, and the account was republished in various journals and books in 1716, 1739, 1749, and 1750; and the operation appears to have been repeated three times upon the brachial artery and once upon the temporal; in one of them the artery was tied "on the inner side of the arm above the condyle;" in all the aneurysm was traumatic.

¹"Car au lieu que l'on a accoutumé de faire la ligature en haut et en bas de l'anevrisme, je ne la fis, dit il, que du côté du haut: d'ailleurs, on ouvre le sac anevrismal, et je ne l'ai point touché du tout, ne doutant pas que le sang contenu dans ce sac ne se dissipât, ayant la liberté de se porter du côté de l'extrémité, et que ce sac étant une fois vuide, ne se rempleroit plus de nouveau, que les tuniques des membranes qui le formoient, ne manqueroient pas de s'affaisser, et qu'ainsi la tumeur devoit disparaître, ce qui n'a pas manqué d'arriver de même que je l'avois pensé."—Trévoux, January, 1716, p. 163; reprinted in "Bibliothèque choisie de méd.," 1749, vol. ii, p. 472, art. "Anévrisme."

The question at once arises: Why was not this method at once accepted by the profession and generalized? The answer is to be found, I think, in the attitude of the profession toward aneurysms in general, and in the ignorance of the existence of the collateral circulation. At the time Anel operated, surgeons attempted the cure only of traumatic aneurysms of the brachial and temporal arteries following venesection; against popliteal and femoral aneurysms they knew of no resource except amputation of the limb, and they had yet to learn even that the femoral artery could not be tied without causing gangrene of the limb. One man (Morel, 1687) had applied the old method to a carotid aneurysm, but his patient died on the table, and the case served as a warning, not as an encouragement. The old method of laying open the sac and tying all bleeding points could be practiced without much difficulty and very successfully upon these minor aneurysms, and, although Anel's method recommended itself as easier of execution, it was, on the other hand, less certain to cure, because many of these aneurysms were arterio-venous aneurysms, and persisted or recurred after ligature of the artery. In two of the four cases above mentioned the disease returned, probably for this reason. In short, as regards some of the cases with which the surgeons of that time had most frequently to deal—arterio-venous aneurysms at the elbow—they possessed and successfully practiced the operation which to-day is still used in similar cases; and as regards the others, traumatic aneurysms of the brachial and temporal arteries, the same method was efficient; and, although the offered substitute was simpler, this advantage was offset by its failure when the aneurysm was arterio-venous; and they did not recognize the cause of the failure, for they had not learned to discriminate between this variety (first described by William Hunter in 1757) and the ordinary aneurysm. They labored under no embarrassment, no great difficulty from which his operation could relieve them; it even exposed them to a variety of failure which they had not before known—the persistence or recurrence of the disease—and their knowledge of the resources of nature was not sufficient to enable them to extend their field of operation. What wonder that the new system was neglected and forgotten!

During the following half-century surgeons learned that it was not necessary to amputate the leg of a patient because the femoral artery was wounded; ligature of the wounded artery had been successfully practiced as early as 1646, and again in 1688, but it was not formally proposed as a substitute for amputation until nearly a century later. And, at about the same time, the "old operation" was first employed in a case of popliteal aneurysm successfully (Keyslère, 1744), and, twenty years later, again successfully for femoral aneurysm (Burchell, 1765).

The attention of surgeons was now fully directed to the treatment of spontaneous aneurysms of the lower extremity, to the search for a proper substitute for the amputation which before had been the only resource. The first substitute was to extend to them the old operation, to repeat in a somewhat modified form what had been done by Antyllus more than fifteen hundred years before. Papers were written to prove that the obliteration of the artery would not cause the limb to fall into gangrene, and experience by actual operation rapidly accumulated.

The results of that experience were far from satisfactory. Pott (*Surgical Works*, edited by Earle, vol. iii., p. 220) says of this operation: "I have tried it myself more than once or twice—I have seen it tried by others; but the event has always been fatal. * * Nor have I ever seen any other operation than that of amputation which has preserved the life of the patient;" and, as Mr. Holmes points out, the immediate success of the treatment of popliteal aneurysm by proximal ligature (the "Hunterian" method), which itself has a mortality equal to that of amputation of the thigh, shows that the mortality after the old operation must have been something frightful. Something better needed to be found, and the times were growing ripe. Men were beginning again to think; the long blank period of tradition and dogmatism was coming to an end, and men stood at the threshold of the new era in which, under the influence of the intellectual upheaval of the French Revolution and the leadership of the French Physicians, medicine was to become a science based on objective knowledge.

It had been learned that a popliteal or a femoral aneurysm could be cured by opening the sac and tying the artery above

and below, but that the operation carried with it an enormous risk of death by secondary hæmorrhage and the accidents arising from a large, irregular, suppurating wound. And, in describing the operation as incision of the sac and ligature of the vessel, it must be remembered that this order was frequently reversed and the artery tied before the sac was opened; the object was a double one: to close the vessel and to empty the sac, and the order in which these objects were attained was immaterial.

Desault's first operation of ligature on the proximal side was done June 22, 1785, and Hunter's December 12th of the same year; but nine years before this, 1776, Desault¹ had had an opportunity to dissect a specimen of popliteal aneurysm that had undergone spontaneous cure, and he had found the popliteal artery plugged by clotted blood, the femoral obliterated "as far up as the origin of the muscular branches," and likewise the upper third of the tibial arteries. An Italian surgeon, Assalini, who spent a year in Paris, and a few months subsequently in London, and had the good fortune to see both Desault's and Hunter's operations in 1785, published a book² in 1787, in which he reports Desault's teaching in 1785. Referring to this dissection of 1776, he says he [Desault] thought the obliteration of the upper and lower portions of the artery was the result of the stagnation of the blood in them, produced by plugging of the aneurysm, and that for this reason, in the treatment of true aneurysms of large vessels, he did not apply two ligatures, and did not open the sac; he placed a single ligature above the aneurysm if that were possible, or below it if the condition of the parts made that necessary. By this simple ligature he prevented the blood from entering the sac and circulating in the dilated vessels.

This report is the substance of a clinical lecture given by Desault at the time of his first operation. It shows his conception of the method of spontaneous cure and of the means by which that method could be imitated; he sought to obtain coagulation of the blood through arrest of the current, by placing an obstacle on either the proximal or distal side, and

¹ Broca, "Des anevrysmes," p. 449, from *Journal de med.* (Vandermonde), vol. lxx., p. 473.

² "Essai médical sur les vaisseaux lymphatiques," Turin, 1787.

he knew—he had known for nine years—that it was not necessary to turn out the clots, that the incision of the sac could be dispensed with if the artery could be otherwisely closed. But how was that to be done? Naturally enough, he first tried compression, and, that failing, then the ligature in continuity. Broca tells us that the first case of which we have knowledge that came under Desault's care was an axillary aneurysm, shortly before February, 1785, and he attempted to treat it by compression of the subclavian artery. Ligature of the subclavian was at that time an unknown operation. For some reason the patient left Desault and put himself under the care of another surgeon, who mistook the tumor for an abscess and opened it.

The idea of compression of the artery above the tumor was not new or unknown. In 1761 Kretschmer treated a traumatic aneurysm, resulting from a gunshot wound of the brachial artery, by direct pressure upon the tumor and by a tourniquet on the lower portion of the axillary artery; the latter was kept in place for three months, and the patient was completely cured. In 1765 Guattani treated a popliteal aneurysm by a bandage applied to the leg and tumor, and to the thigh over a long, narrow pad, placed along the course of the femoral artery, with the expressed intention of preventing, wholly or in part, the flow of blood to the tumor. And again, in September, 1785, at a consultation held in London on a case of femoral aneurysm as large as a middle-sized China orange, at which eight surgeons (of whom Hunter was one) were present, all "were convinced of the impracticability of affording the patient any assistance by the operation usual for aneurysms," and advised that the artery should be compressed at the groin; the attempt was made, but soon abandoned, because of the pain.¹

We are now able to understand the position of the profession at the time; we know the extent of their knowledge, and with what problems they were dealing; we can put ourselves in Desault's place, interpret his act, and comprehend his motives. Let us see if that act was, as the partisans of Hunter claim, merely a lucky blunder, conceived in ignorance and passed without appreciation.

¹ *London Medical Journal*, 1788, p. 149. "Cases of the Spontaneous Cure of Aneurism," by Mr. Edward Ford.

Desault knew an aneurysm could be cured without an incision to turn out the clot; he knew, as did most other surgeons, that the femoral artery could be tied without causing gangrene. He knew also that the principal cause of death after the common operation was secondary hæmorrhage, and the avoidance of this danger was his principal preoccupation, as it was also that of Hunter. We have seen that far from trying to get rid of the clot, he sought to cause clotting, and at the same time avoid hæmorrhage, by compressing the artery on the proximal side. The attempt failed, presumably because of pain, and, when the next case came under his care, he substituted the ligature for compression.

The operation was done June 22, 1785, at the Hôtel Dieu in Paris. The patient was thirty years old; the aneurysm, of the popliteal artery, was as large as a turkey's egg. By an incision two inches long, Desault exposed the artery "immediately below the ring of the third adductor," separated it from the nerve, and tied it; he placed also a *ligature d'attente* above it, and tied this on the sixth day. The tumor promptly diminished to half its size, and the œdema of the leg disappeared. On the eighteenth day the ligature came away, and on the following day a large quantity of pus and blood escaped through the wound, apparently in consequence of rupture of the sac, and the wound then healed.

Desault operated upon only one additional case; this was shortly after Hunter's first case, and Desault, following Hunter's example, which was known to him, placed the ligature on the femoral artery, but at a still higher point. The patient died.

There remains now to be considered only the part taken by Hunter in the introduction of the ligature. We have already seen that in September, 1785, three months after Desault's operation, he had nothing to suggest in the treatment of a femoral aneurysm as large as a medium-sized orange, except compression of the artery in the groin, and this was unsuccessfully tried. Three months later, December, 1785, he tied the femoral artery for a popliteal aneurysm.

The case was reported by Everard Home, in the *London Medical Journal*, 1786, p. 394, and again, with four similar operations done by Hunter and by three others, in *The Transactions*

of a Society for the improvement of Medical and Surgical Knowledge, London, 1793, p. 138. The date of the reading of the latter paper is not given, but that of the one that precedes it is September, 1789, and that of the one that follows it is September, 1790. The second account is almost a literal transcript of the first. I quote from the second:

The patient was a coachman, forty-five years old, and the aneurysm "was so large as to distend the two hamstrings laterally and make a very considerable rising between them. * * The operation was begun by making an incision on the anterior and inner part of the thigh rather below its middle, which incision was continued obliquely across the inner edge of the sartorius muscle, and made large, to give room for the better performing of whatever might be thought necessary in the course of the operation. The fascia which covers the artery was then laid bare about three inches in length, after which the artery was plainly felt. A slight incision, about an inch long, was then made through this fascia, along the side of the vessel, and the fascia dissected off; by this means the artery was exposed." A double ligature was passed around the artery [and vein] and "cut so as to form two separate ligatures. The artery was now tied by both these ligatures, but so slightly as only to compress the sides together. A similar application of ligature was made a little lower. The reason for having four ligatures was to compress such a length of artery as might make up for the want of tightness, it being wished to avoid great pressure on the vessel at any one part." [A fuller explanation of this practice is given in an earlier sentence (p. 145) as follows: "The cause of failure arises from tying a diseased artery, which is incapable of union in the time necessary for the separating of the ligature." Apparently Hunter thought that by tying the artery loosely more time would be given for the artery to become sealed before the ligature cut through. Certainly his intention was not simply to diminish the stream, for the ligatures cut through, and in his subsequent operations he used a single ligature and tied it tightly.] Secondary hæmorrhage occurred on the ninth day, but was controlled by a tourniquet; "on the fifteenth day some of the ligatures came away, followed by a small discharge of matter, the tumor in the ham being lessened." In April, and again in

July, more of the ligatures came away, and on July 8, 1786, he was discharged cured. April 1, 1787, fifteen months after the operation, he died of remittent fever. His following four operations were similarly performed, except that in the fourth and fifth the artery alone, and not the vein, was tied. The second died of secondary hæmorrhage on the twenty-sixth day.

This is followed by the account of three operations performed after the same method by other surgeons, of one of which, by Pott, he says: "*This mode of operating*¹ was adopted by Pott in a case of popliteal aneurysm," and he goes on to describe how the artery, probably the popliteal, was exposed by "an incision five inches in length, upon the posterior part of the thigh * * * between the two hamstrings;" and he adds (p. 173): "The mode of taking up the artery in the ham must be always unfavorable to the future success of the operation, if either the artery itself should be diseased, or if the tumor, by being so contiguous to the violence done in the operation, should be affected by the consequent inflammation, which seems to have been the case in Mr. Pott's operation, as I understand two abscesses were found close to the side of the sac." Here is the same operation as that done by Desault (ligature of the popliteal artery) and quoted by Home, in the first authorized account of Hunter's method, as an example of Hunter's method, and this in itself would be sufficient, even if it were not corroborated again and again in the article, to show that Hunter's only idea was to tie the artery without opening the sac, and the reason he gives for tying it at a somewhat higher point (two inches at the most) than Desault and Pott did is (*London Medical Journal*, and repeated by Home, *loc. cit.*, p. 146) that, "if the artery should afterward [after ligature of the popliteal] give way, there will not be a sufficient length of vessel remaining to allow of its being again secured in the ham. To follow the artery up through the insertion of the triceps muscle, to get at a portion of it where it is found [? sound], becomes a very disagreeable part of the operation; and to make an incision upon the fore part of the thigh, to get at and secure the femoral artery, would be breaking new ground—a thing to be avoided, if possible, in all operations. In one of the remaining two

¹ Italics mine.

cases, a femoral aneurysm, extending to within two inches of Poupart's ligament, Mr. Cline tied the artery *half an inch below* the origin of the profunda, and, as the dissection showed, two inches above the orifice of the sac. This also is given in illustration of the method, and yet there could have been no collateral branches between the ligature and the sac; certainly none are mentioned.

In short, his one idea was to avoid secondary hæmorrhage by tying the artery at such a distance from the aneurysm that it would probably be found healthy, and to make the application of a second ligature easy if such hæmorrhage should occur. Of the "excogitation of a principle by profound reasoning," of which Mr. Holmes speaks, there is not a trace in this account; of the second "great merit" attributed to him by the same able writer, "that it was not necessary to stop the circulation through it [the sac] absolutely, but only," as he said, "to take off the force of the circulation," there is no justification except this quoted phrase, which, in view of the fact that the ligatures divided the arteries completely, although, perhaps, more slowly than if they were tied tightly, certainly cannot have the meaning attributed to it of only diminishing the stream of blood, and which, even if it did, was abandoned after the first operation, when he substituted a single ligature tied tightly for four ligatures tied loosely.

Moreover, the idea of curing an aneurysm by simply diminishing the flow of blood through it was by no means new; it underlay all the preceding attempts to cure by compression, and was plainly included in Desault's lecture reported by Assalini and quoted above. It was not until after the ligature in continuity had shown that the danger of secondary hæmorrhage was still present that very forcible compression, to effect complete and permanent closure of the artery, was tried as a substitute for the ligature.

The three grand merits claimed for Hunter (Holmes's *System of Surgery*, art. "Aneurysm") are that he had seen: 1. That it was not necessary to turn out the clots; 2. That it was not necessary to stop the circulation through the sac absolutely, and that, therefore, the artery might be tied at some distance above it; and, 3. That the ligature of the main artery would not involve gangrene of the limb. Now, of these, the first was

certainly known by Desault, through a post-mortem examination, and probably by most other surgeons, as is proved by their attempts to cure by compression. As regards the second, the fact contained in the first clause, that it was not necessary to stop the circulation completely, had been long known before his operation, and the inference stated in the second clause was not drawn by Hunter, and was not given as his reason or justification for placing the ligature at a higher point. Home's paper (which, it must be remembered, is an official one, and made in Hunter's name) does not contain a single reference to collateral branches given off between the ligature and the aneurysm.¹ The phrase "that simply taking off the force of the circulation is sufficient," which is also quoted as meaning that a diminished stream of blood was expected to be brought to the aneurysm by collaterals, is the only thing in the entire paper that can suggest such an idea; and that neither this meaning nor the one above referred to—of only partly compressing the artery—was intended to be conveyed by it, is shown not only by actual statement of the reasons and objects of the operation, but also by a case which he quotes (p. 156) in illustration of his argument—a case of spontaneous cure of an aneurysm by inflammation of the sac, accompanied by arrest of pulsation in the sac and in the artery immediately above it. If the phrase were written out in full to express the entire idea, it would read: "It is sufficient simply to take off the distending force of the arterial stream from the blood contained within the aneurysm; the blood will then coagulate in the sac and in the adjoining part of the artery, and the progress of the disease will then be stopped; it is not necessary to open the sac."² The opening of the sac is what he was thinking of

¹The only reference to collaterals in the first paper is one (p. 399) to the effect that "surgeons have laid too much stress on the necessity of large collateral branches being present to insure the success of this operation, * * since we find that the trunk of the femoral artery may be taken up in any part of the thigh without producing mortification of the limb."

²Compare the corresponding paragraph in *London Medical Journal*, letter of Home, November, 1876, p. 393.

"From these considerations [those quoted above about the desirability of not breaking new ground], suggested by the accident of the artery giving way, which happened several times to Mr. Hunter, he proposed, in *performing this operation*, that the artery should be taken up at some distance from the diseased part, so as to diminish the risk of hæmorrhage and admit of the artery being more readily

when he used the word "simply," not of the presence or absence of collateral branches, not of merely diminishing the stream.

The third great merit—that Hunter saw that the ligature of the main artery would not involve gangrene of the limb—had been known for a hundred years, and had been proved by every successful case in which the old operation had been used, and also by Desault's ligature in continuity six months before.

Both Desault and Hunter had the same object in view: to cure the aneurysm without opening the sac. Desault had a small aneurysm, and tied the popliteal at its upper end. Hunter had a large one, and tied the artery a little higher up (he could not well have done differently). Desault, in his second operation, went still higher, and tied a little below the apex of Scarpa's triangle; subsequent operators have habitually tied in the triangle itself. Even the observation claimed for Hunter—that the artery was diseased above the aneurysm, and that this was the cause of the secondary hæmorrhage—had been made before him, and was given by Pott as a reason for preferring amputation to the old operation (Pott, *loc. cit.*, p. 220).

I see nothing in Hunter's operation radically to differentiate it from Desault's and to justify the ascription of the method to the English surgeon. It seems to me to be beyond question that Desault had grasped the principle, and the difference of an inch, or two or three or six inches, in the distance, is a matter of detail which is to-day subordinated to the rule that the artery should be tied at the nearest accessible point that does not directly involve injury to the sac.¹

secured, should any such accident happen. *The force of the circulation being thus taken off from the aneurismal sac, the cause of the disease would, in Mr. Hunter's opinion, be removed; and he thought it highly probable that, if the parts were left to themselves, the sac, with the coagulated blood contained in it, might be absorbed, and the whole of the tumor removed by the actions of the animal economy, which would consequently render any opening into the sac unnecessary.*" [Italics mine.]

¹ It seems unnecessary, in view of these facts, to consider the question whether or not Hunter knew of Desault's operation before performing his own. The facts bearing upon it are, that Assalini was at Desault's operation, afterwards went to London, and was present at Hunter's operation, and that Hunter, three months before his operation, seems to have made no suggestion of this treatment in the case of femoral aneurism, quoted above, which he saw in consultation, and which, after a futile attempt at cure by compression, was abandoned to its fate.

Why Hunter's name should have become so pre-eminently identified with it is to be explained by reasons entirely independent of the principle involved, and of the measure in which that principle was grasped by the two great rivals. Hunter enjoyed a great authority and was widely known; his example was followed, his practice was quoted by those who wrote in our language. Desault lived and made his great discovery at a time when his nation was entering upon a revolution that shook the world and isolated France by war for nearly twenty-five years; he made it at a time when men were occupied with mighty interests beside which the advance of science seemed as nothing; at a time when, to Lavoisier pleading for another fortnight of life that he might complete certain experiments, the answer was: "The Republic has no need of such." What wonder that at such a time and amid such surroundings his discovery should have passed unheeded by those about him, and have remained unknown by those who were at war with the country? It is our privilege, our duty, to recognize his work and to give him the credit that is his due.

A SUCCESSFUL CASE OF LAPARO-ELYTROTOMY, WITH REMARKS ON THE OPERATION.

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MRS. Margaret McMeekan, aged twenty-one years, a native of Glasgow, the subject of rickets when a child, was taken in labor with her first child at 4 A. M., Oct. 4, 1884. The escape of the amniotic fluid was the first incident that indicated the approach of labor. She was seen by Dr. L. S. Pilcher at 8 A. M.; on examination the Dr. found a vertex presentation of a fully developed child, while the antero-posterior diameter of the superior strait was estimated by him at less than two inches. He sent for me to meet him in consultation, and to come prepared to operate if we deemed it imperative. When I arrived,

a little before noon, dilatation of the os had become well advanced, it indeed seemed, on vaginal examination, to be complete; the uterine contractions were regular and moderate, and the general condition of the patient was excellent.

As it was clearly evident that the delivery of a living child through the natural passages was an impossibility, and as we both further believed the mother's chances would be better if subjected to laparo-elytrotomy than if craniotomy were to be attempted, we advised the abdominal section. This was readily consented to, and with the assistance of Drs. L. S. Pilcher, G. R. Butler and L. C. McPhail, I at once operated.

The usual incision was made in the left groin, and nothing unusual was encountered until I divided the internal epigastric artery. This was at once secured by a Péan forceps and gave no further trouble. After reaching the wall of the vagina, a small incision was made, and this was enlarged by tearing it. In so making the incision, it extended a little beyond the junction of the vaginal and vesical walls, and in consequence a minute opening was made into the bladder.

Some little time was now lost in effecting complete dilatation of the uterus; for, although to the examining finger the dilatation had seemed complete before commencing the operation, it was not found to be so when the artificial vaginal opening had been made. A living male child, fully developed, weighing seven pounds, was then delivered by version and extraction through the wound in the groin. The placenta was delivered by contraction of the uterus aided by external manipulations. The operation-wound in the groin was closed by carbolized silk sutures, a soft rubber drainage tube being carried from the inner angle of the incision downward through the vagina and out below at the ostium vaginæ. Nothing was done to the bladder-tear, but a self-retaining catheter was inserted in the bladder.

The after-history of the case presented no untoward feature. The temperature remained most of the time between 99° and 100° F., rising above 100° only once, and that during the second day on account of blocking up of the drain, except on the fourth day, when the irritation caused by distension of the breasts by a copious milk secretion caused an elevation of temperature to 100.25° for a day. Union by first intention occurred along the entire operation-wound. The drainage tube was removed on the ninth day, and the sinus made by the drain closed at once.

On the twenty-first day after the operation (Oct. 25) the catheter was removed from the bladder, and the patient was allowed to sit up. A degree of vesical irritability remained after the removal of the catheter, necessitating micturition at first every two hours. Two weeks later

the period during which she could retain her water amounted to three hours, and at the date of this report (November 24) it still remains at about that degree. Her general condition is excellent. See has not nursed her child, but it has grown well and thriven on artificial food.

This makes, I believe, the ninth case of laparo-elytrotomy on record, and the fourth one in which I have operated.

Of these four, three have been successful, both mothers and children being saved. With each succeeding case I become more and more convinced of the great superiority of this operation over the Cæsarian section, for this class of cases. It is both easier and safer to do.

Certain points in regard to the operation, I think, are worth speaking of.

It is quite important to have sufficient dilatation of the cervix before beginning the operation. To dilate after the cervix is exposed through the wound is easy, but it takes time, which one begrudges during the operation. I refer to this, because complete dilatation of the cervix by the natural means seldom takes place in these deformed pelves, and artificial dilatation is difficult. The uterus lying high up in the abdomen, because of the contracted antero-posterior diameter of the superior strait, makes it impossible for the membranes to freely distend the cervix, except laterally, and hence the membranes rupture early. There is also the same mechanical difficulty in the way of the presenting part of the child completing the dilatation. I believe that owing to these obstacles dilatation is seldom completed without artificial aid. At least it has been so in my four cases. It is well then to dilate the cervix, if need be, before beginning the operation, if after reasonable waiting it does not take place in the natural way. It is often difficult to estimate just how much dilatation has taken place, as it was in this case, where we thought complete dilatation had occurred before we began to operate. It is therefore well to keep in mind that one is apt to get too little dilatation by the natural means.

In regard to the anatomy of the region involved in the operation, my recent observations confirm the views that I have entertained from the first, namely: that the only safe guide to the surgeon in his dissection is a thorough familiarity with the appearance of the various organs and tissues, which enables him

to recognize the structures as he meets them. Dissertations on the regional anatomy, taken from dissections made upon normal subjects, with the relations of parts as indicated by measurements, are not to be depended on. But, while placing little reliance on these paper anatomists, I esteem very highly the anatomical observations in regard to this operation contained in the papers of Dr. B. F. Westbrook, of Brooklyn, and Professor Polk, of New York.

In the subjects requiring this operation, however, the parts are in such a distorted condition that the surgeon will always have to depend mainly on his ability to recognize individual tissues, wherever they may be located.

Danger from hæmorrhage has been anticipated in laparotomoty, and yet practically this fear has not been justified. So far I have not had any trouble from hæmorrhage, either primary or secondary. In dividing the abdominal wall, the only vessel of importance in the way is the external epigastric artery, which must necessarily be divided. No further care of that has been required than compression for a short time by a Péan-forceps.

The internal epigastric artery I have usually found lying upon the peritoneum and easily separated from the tissues to be divided, so that it could be drawn aside with the peritoneum out of harm's way. But in this case it was separated from the peritoneum far enough to allow me, unsuspectingly, to pass my grooved director under the artery and above the peritoneum, and so divide the former. However, the artery was easily caught up in a forceps which we left hanging to it, until the child was delivered; when the forceps was removed there was no further disposition to bleed, and no further notice was taken of this vessel.

This shows that there is no great danger from hæmorrhage, and I have not had to ligate a single vessel in any of my four cases. I do not think the loss of blood has been more than in a normal labor, certainly none of my patient's have suffered unduly from it.

Much care is necessary in order to save the bladder, in fact, wounding the bladder is the only accident that has happened to me in the operation.

I stated in the report of my second case that there was no

reason in the nature of the operation for wounding the bladder. I still hold to this opinion, and think that with due care this accident can always be avoided. In this case the bladder, as usual, was displaced laterally, so that it extended up to the ileo-sacral junction, and its wall lay above and nearly filled in the place where the vagina had to be opened. The vaginal wall was unusually short, so that it was difficult to bring it high up into the wound, where I could reach it from above. This brought the vagina and the bladder too close together, and in opening the former I inadvertently made a small wound in the latter. A mere slip of the scissors on my part did the mischief; it was not due to any fault in the mechanism of the operation.

I should have guarded against this accident, and proved the claim that the bladder can always be avoided by care, but my mistake has the compensating advantage of showing how trifling the accident is, for the bladder healed without any sutures being needed.

In conclusion, I can only express the hope that this operation will soon become more generally resorted to, especially in those countries where there are so many more unfortunate mothers the subject of similar deformity.

EDITORIAL ARTICLES.

ANNUS CHIRURGICUS—1884.

THE Surgical Year of 1884 has contained much of interest. While it has not been marked by any special discovery or advance that will constitute an epoch in Surgery, it has accomplished most noteworthy results in the line of testing the value of the discoveries and advances of previous years, and by the carefulness and extent of these tests, and the wide comparison of results that have been made, the work of the year has served to strengthen greatly the foundations of the New Surgery. Perhaps no better single exponent of the character of the year can be mentioned than the surgical part of the International Medical Congress of Copenhagen, as in it were found actively participating distinguished representatives of all the countries in which at the present day the most active progress in the science and art of Surgery is being made. Here the extensive and bold operative measures for the extirpation of cancerous growths involving the rectum advocated by Esmarch are the logical result of the acceptance of the now apparently well-established truth that such malignant growths are primarily local in their character, together with a well-founded confidence in the ability of the surgeon to largely control the results of the operative wounds he makes, provided the immediate severity of the operation is not fatal. This is quite characteristic of the prevailing tendency in a large class of the surgeons of to-day, while, on the other hand, the more conservative spirit of yet another class is equally illustrated by the advocacy by Bryant of a more general adoption of the palliative and tentative measure of Lumbar Colotomy. The question as to the best method of osteotomy for the relief of genu valgum found judicial and probably permanent settlement in the endorsement which the operation of Macewen received from Ogston, Chiene and Schede. At this Congress, also, an important phase of the living subject of the day—surgical tuberculosis—was discussed by Ollier, Volkmann and Trélat, in connection with the paper of the former on "Resection and Arthrotomy in Tuberculous Joint Inflammations." Antiseptic Methods of

Wound Treatment occupied, likewise, a prominent place in the discussions of this body, the most important contributions to which being by Esmarch, Mosetig-Moorhof, Schede and Mikulicz.

If we turn from this truly international gathering, and attempt to enumerate the individual contributions to surgical literature that have been made during the year 1884, in different countries, the activity of the year becomes at once evident, and one is impressed with the energetic strife after foundation facts, definite results, and simplicity of methods that has marked the work of the year.

A more satisfactory review of the year's work may be obtained by considering the more prominent features of the work that has been done in each of those countries which exhibit the greatest amount of progress, viz.: Great Britain, the United States, Germany and France. In attempting such a review, however, the reader will understand that the first three quarters, only, of the year can be included in the retrospect, so that, with rare exceptions, the work described, will be that which has transpired previous to October 1st.

In GREAT BRITAIN, there has been a very notable activity in surgical work and thought as manifested by the number and value of the contributions to surgical literature that have been made. Macewen's paper on osteotomy for genu valgum, already referred to, relating the collected experiences of himself and many other surgeons, and showing the enormous success of the proceeding, though read at Copenhagen, belongs of course to British surgery. The discussion furnished the excellent example of Professor Ogston handsomely confessing the superiority of Macewen's operation over his own. At the same time the history of antiseptic osteotomy for genu valgum must always recognize in Ogston its pioneer. 1884 saw two cases of hemorrhage from the popliteal in Macewen's operation—one, Mr. Langton's,¹ the other, Mr. McGill's.² In the former case resection of the fragments (one of which is said to have caused the arterial wound), ligation of the popliteal and, lastly, amputation on account of gangrene, were followed by death. McGill made a longitudinal incision into the popliteal space, tied the artery and happily saw his patient recover without a bad symptom. The account of Langton's case is deficient in important

¹ *Lancet*, March 29th.

² *Lancet*, May 17th.

details. The incisions employed to permit resection of the ends are not described, though they may have been serious, and possibly played a part in bringing about the gangrene. There is every reason to believe that if the popliteal were wounded during the performance of a Macewen, double ligation and intermediate division of the artery through a single *longitudinal* incision would almost invariably give a good result. Mr. Reeves¹ takes the opportunity of advocating his method of dividing the femur higher up. Mr. Arthur Barker² describes an operation strictly analogous to Macewen's for knock-knee, but performed on the first metatarsal bone for the cure of hallux valgus. He says it was suggested to him by Mr. C. Hoar.

A good deal of attention has lately been attracted to a disease of children, variously named "Infantile Scurvy," "Scurvy Rickets," "Acute Arthritis of Infants," etc. Cases have been related by Mr. R. J. Godlee,³ Mr. Edmund Owen⁴ and Mr. G. R. Lake.⁵ Dr. Judson S. Berry (Manchester) describes, with illustrations, a case of osteomalacia in a female child, eight months old, and refers to the literature of the subject, at the same time discussing the nature of the affection and its relation to rickets. Mr. Davies-Colley⁶ relates a case of late rickets as "Juvenile Osteomalacia" in a girl of thirteen. Mr. R. W. Parker discusses at length the question of "Food and Rickets." He thinks too much stress has been laid on food as a cause, and that there are other factors still to be determined. Professor Ogston has introduced a new operation for flat-foot, which may be shortly stated as a proceeding to bring about, artificially, a bony ankylosis of the astragalo-scaphoid joint, the surfaces of which are excised and the constituent bones pegged together.⁷ Mr. Keetley has published a paper based upon ten osteotomies of the hip for ankylosis.⁸ To those he has since added six more, which, for the most part, confirm the statements made in the said paper. Mr. Keetley has also, during the past twelve months, on several occasions, scraped the medulla out of the shafts of certain of

¹ *British Medical Journal*, June 28.

² *Lancet*.

³ *Lancet*, January 12th.

⁴ *Lancet*, February 9th.

⁵ *Lancet*, March 22nd.

⁶ Pathological Society, April 12th.

⁷ *British Medical Journal*, April 26.

⁸ Medical Society. All the journals contain accounts of this paper, some *in extenso*.

⁹ *British Medical Journal*, February, 1884.

the long bones, including the femur, with results described in a paper published in the present number of this journal. Mr. Simpson, of Lincoln,¹ reports of two cases of excision of the os calcis for caries that the condition was excellent two years afterwards. A paper by Mr. C. MacNamara² on "Epiphysitis" received much criticism from Mr. Holmes and others. Mr. C. Mansell Moullin describes "some forms of osteitis in connection with hereditary syphilis," classifying a number of cases observed by himself.

Fracture of the patella has attracted great attention in connection with the question of antiseptic suture. The last quoted author (Mr. Mansell Moullin³) relates that he found it impossible to approximate the fragments in an old case, and that, therefore, the attempt to wire had to be given up. Believing as we do in the essential safety of operations on the principle of Macewen's osteotomy when done according to Macewen's directions, we would suggest that, where other means fail, the femur itself be temporarily shortened by osteotomy of its shaft. There is a case related in "Hamilton on Fractures," in which the femur and patella having been simultaneously broken, the latter united by bone, almost the only instance of that event in Hamilton's personal experience. Professor van der Meulen, of Utrecht,⁴ relates three cases of what he calls suture without opening the knee joint. How far this description is just is doubtful. Mr. A. G. Millar (Edinburgh), in the course of an interesting account of Lister's present mode of carrying out antiseptic surgery,⁵ describes a case in which he rubbed the fragments together in order to rub out of the way the interposed fibrous material. He then applied Malgaigne's hooks. The result could not be given, only a fortnight having elapsed. He mentions a case seen by him in Lister's own wards in which suppuration followed suture. Mr. Christopher Heath describes the treatment of fractured patella by the immediate application of plaster of Paris bandages.⁶ Antiseptic suture of other bones is illustrated by Mr. G. A. Wright,⁷ and by an excellent series of five cases of ununited fracture described by Mr.

¹ *Lancet*, February 2nd, 1884.

² Royal Medical and Chirurgical Society, April 22nd.

³ January 26th.

⁴ *Lancet*, March 22nd.

⁵ *Edinburgh Medical Journal*, February, 1884.

⁶ *Lancet*, May 24th.

⁷ *Lancet*, January 5th.

Turner, of the Dreadnought Hospital; of these two were pegged, and three wired. Professor Gordon (Belfast)¹ publishes a paper based on specimens in the Queen's College Museum, in which he shows how fractures of the leg can be classified into different species, requiring distinct methods of treatment. Mr. Arbuthnot Lane read a paper on fractures of the sternum and first costal cartilage, which led to a discussion at the Pathological Society.²

No other affection of the articulations has this year attracted nearly so much notice as "Charcot's Joint Disease." Cases have been recorded by Messrs. Clifford Albutt,³ Barr,⁴ Clement Lucas,⁵ Raven⁶ and P. H. Kidd;⁷ and Dr. Hale White⁸ argues "that a large number of cases that have been brought forward as cases of Charcot's joint disease belong to ordinary and well-known forms of arthritis, possibly somewhat modified by the condition of the patient." Sir George Porter⁹ describes a case in which a pistol bullet was removed from the knee joint, where it had lodged fourteen years before. This author bears testimony to the value of Listerism, as also does Mr. Rivington in a clinical lecture¹⁰ in which he gives a resumé of the present position of pathology and practical surgery with regard to loose cartilages. The question of attempting to obtain a movable joint after excision of the knee was raised by Professor Bennett in relating a case in which chance had produced that result, and, in the discussion, the various aspects of the matter were briefly but clearly presented by Messrs. Stokes, Corley, Thomson and Ormsby.¹¹ At the Belfast meeting of the British Medical Association, Mr. A. T. Norton¹² described some remarkable cases of destructive arthritis associated with large "ganglia" containing melon-seed bodies, etc., and in every instance leading to amputation. Mr. R. C. Lucas¹³ has a paper on the association of flat-foot, weak ankle, etc., and albuminuria. He attributes

¹ *Dublin Medical Journal*, April.

² March 5th, 1884.

³ *British Medical Journal*, January 5th.

⁴ *British Medical Journal*, February 2nd.

⁵ Clinical Society, February 22nd.

⁶ *British Medical Journal*, February 23rd.

⁷ *Lancet*, July 12th.

⁸ *Lancet*, July 12th.

⁹ *Dublin Journal*, March.

¹⁰ *Lancet*, February 9th.

¹¹ *Dublin Medical Journal*, August.

¹² *British Medical Journal*, August 30th.

¹³ *British Medical Journal*, May 3.

these troubles, when co-existent in adolescents, to masturbation. He names the condition so produced "rickets of adolescents," apparently unconscious that Mikulicz has used that term, or rather its Latin equivalent, "rachitis adolescentium," some years ago. Mr. Jonathan Hutchinson publishes a lecture on injuries to the elbow-joint in children. He gives some very practical rules.¹

The most important contributions of British Surgery to the question of the treatment of spinal affections are the papers by Mr. Treves at the Royal Medical and Chirurgical Society,² and the discussion thereon. The subject was the opening of spinal abscesses in the lumbar region, and the advantages of thus draining them near their source. Mr. Treves related several cases in which he had done this, and Mr. Keetley took the opportunity of describing cases in which he had adopted a similar procedure, combined with the direct application of iodoform to the seat of caries. Many valuable and interesting facts and opinions were added by Messrs. Bryant, MacNamara, Knight Treves, R. W. Parker, Marsh, Savory and Eve. At Belfast Professor Sayre gave a demonstration of his modes of treating spinal diseases, and there was a discussion thereon.³ An ingenious and promising appliance for case of cervical caries is Fleming's "expanding india-rubber bag."⁴ An observant paper on spinal deformity was read by Mr. Arbuthnot Lane at the Medical and Chirurgical Society.⁵ Sarcoma encroaching upon the spine and causing a kind of angular curvature is illustrated by an interesting case reported by Mr. Lawrence Humphrey.⁶ Mr. C. A. Ballance⁷ relates a case of acute atlanto-occipital disease associated with pyæmia and followed by death, concerning which he justly remarks on the feasibility of opening and draining the articular abscess in such cases.

British surgery has been comparatively quiet on the subject of the surgery of the nerves lately, but Mr. T. F. Chavasse has an excellent paper on neurectomy,⁸ with a table of hitherto published cases. There are twenty-four. None were fatal. Relief was usual, "for longer or

¹ *Medical Times and Gazette*, January 5th.

² January 8th, 1884.

³ *British Medical Journal*, August 16th.

⁴ *Glasgow Medical Journal*, May.

⁵ *Lancet*, June 10th.

⁶ *Lancet*, January 5th.

⁷ *Lancet*, May 17th.

⁸ Medico-Chirurgical Society.

shorter periods." The discussion thereon brought out the experience of others and comparisons between neurectomy and nerve-stretching. Dr. MacDougall,¹ of Carlisle, and Mr. A. W. Hare,² have papers on the etiology of tetanus. The evidence in favor of tetanus being a blood disease, possibly or probably of micro-organismal origin accumulates. Mr. Edmund Owen relates a case of "perforating ulcer in a child."³

In the matter of amputations, Mr. W. P. Keall, of Bristol, gives a case of amputation for senile gangrene, and points out the great difference, in tendency to spread, between gangrenous toes and a patch of sloughing flap (should that misfortune attack the stump of a limb amputated for the affection in question). Strict Listerism will make the latter comparatively harmless, Mr. Pick advocates Dr. Stephen Smith's method of lateral flaps for amputating through the knee.⁴ Dr. James Hardie describes and praises amputation by "oblique—circular incision."⁵ Mr. F. Page gives the statistics of Newcastle Infirmary (1878-1883), bearing testimony to the efficacy of Listerism.⁶ But in the matter of amputations, attention in England has lately been more especially attracted to the success of what is known as "Furneaux Jordan's method" of amputating at the hip. Dr. MacLaren, of Carlisle, relates five cases,⁷ and Mr. T. F. Chavasse three;⁸ a discussion on MacLaren's cases is reported.

⁹The surgery of the head has been as interesting as usual and not less promising. Dr. Macewen is again to the fore with a case in which, with most satisfactory result, he trephined the skull and incised the brain for syphilitic hemiplegia. The case and the discussion thereon¹⁰ should be read. Mr. Walsham¹¹ contributes a valuable and elaborate paper on "Trephining the skull in traumatic epilepsy," with a table of published cases, eighty-two in number; forty-eight were cured, and thirteen relieved. It is presumable that there has been much

¹ *Lancet*, July 19th and 26th.

² British Medical Association Meeting, Belfast, August.

³ *Lancet*, April 5th.

⁴ Medical Society, January 14th. †

⁵ *British Medical Journal*, January 19th.

⁶ *Lancet*, April 5th.

⁷ *British Medical Journal*, June.

⁸ *British Medical Journal*, May 3rd.

⁹ *Edinburgh Medical Journal*, May.

¹⁰ *Glasgow Medical Journal*, February.

¹¹ St. Bartholomew's Hospital Reports (last volume).

silence about the unsuccessful and possibly fatal cases Dr. W. I. Wheeler¹ advocates trephining in mastoid and tympanic diseases. Mr. A. S. Durham has a successful case of trephining for neuralgia.² Dr. Hector Cameron³ points out what is by no means generally known, namely, the very slight pressure required to stop hæmorrhage from a wounded cerebral sinus. With reference to the subject of that peculiar affection of memory in which the incidents of a limited time immediately preceding a head injury are forgotten, Mr. Spence and Mr. Rabagliati relate three cases.⁴ Mr. Gilbert Barling⁵ writes on the treatment of compound depressed fracture of the skull. His cases shew how greatly the prognosis is darkened by injury to the dura mater.

Dr. Kendal Franks describes a case in which he excised the tongue, tonsil and part of palate for cancer.⁶ Professor McLeod (Calcutta) gives the details of two cases of extirpation of the larynx.⁷ Mr. Walsham advocates warmly Nelaton's operation of splitting up the palate for the removal of naso-pharyngeal polypus, and relates an instructive case.⁸ Mr. Wheeler recounts two cases of pharyngotomy, one for the extraction of a needle, the other for the extirpation of a tumour. The practical points on which he mainly insists are—free external incision, small internal one, no sutures, proper drainage.⁹ Mr. Frank Marsh (Staffordshire Infirmary) criticises forcibly and unfavorably the continental operation of thermo-tracheotomy, *i. e.*, tracheotomy by means of Paquelin's or of the galvano-cautery. Dr. T. A. Gresswell describes a plan for exercising the larynx so as to teach it to gradually resume its functions after they have been suspended in consequence of tracheotomy.¹⁰ Mr. Butlin has a case of œsophagotomy for the removal of impacted gold tooth plate. Death occurred from sepsis.

Mr. Howse's plan of dividing the operation of gastrostomy into two stages, after a plan analagous to that recommended by Volkmann, for the removal of hydatids from the liver, has entirely revived this department of practical surgery. In a communication to Mr. T. F.

¹ *Dublin Medical Journal*, October.

² *Lancet*, March 28th.

³ *Lancet*, May 24th.

⁴ *Lancet*, April 19th.

⁵ *Birmingham Medical Review*, April.

⁶ *Lancet*, June 28th.

⁷ *Lancet*, April 26th.

⁸ *Lancet*, July 19th.

⁹ *Dublin Medical Journal*, October.

¹⁰ *Lancet*, January 19th.

Chavasse,¹ Mr. Howse says he now attempts to dispense with sutures, and explains how he fixes the viscus with forceps instead. We believe that in an unpublished case of Professor Lister's the execution of the new plan has been followed by disastrous results. Mr. Thos. Jones, of Manchester, has an instructive paper based on six cases, of which three were successful, one, at least, brilliantly so. One died on the 13th day through a pint of *cold* milk being poured into the stomach. Mr. C. MacNamara² and Mr. Wright, of Nottingham,³ relate successful cases. Others also, not yet published, some successful, some otherwise, have been performed in London. Among the former are cases by Mr. A. B. Barrow and by Mr. E. H. Fenwick. Gastrostomy is one of the subjects treated of in Sir Wm. MacCormac's excellent address at Belfast.⁴ A remarkable case of gastrostomy for the removal of an immense hair-ball occurred in the practice of Mr. Knowsley Thornton and Mr. Symonds, and is noticed in the *British Medical Journal*.⁵

Mr. Southam relates a case of duodenostomy.⁶ Professor Macleod discusses the choice of operation for intestinal obstruction.⁷ This paper was followed by a discussion. Mr. Kendal Franks relates two cases.⁸ Mr. Clutton has a successful case of operation for the relief of obstruction.⁹ With regard to resection of the small intestines, Mr. G. H. Makins publishes one case,¹⁰ and Mr. Angus Macdonald another.¹¹ The former was for the cure of artificial anus, and the latter occurred in the course of laparotomy for extra-uterine pregnancy. Mr. Whitehead describes, with illustrations, a remarkable instance of multiple adenoma of the colon and rectum.¹² The questions of colotomy and excision of the rectum have lately come to be, to a great extent, a question of one versus the other. In this country, and perhaps also in France, colotomy is much more popular than excision. The more advanced ideas of Germany were displayed at the late Copenhagen

¹ *Lancet*, June 7th.

² *Lancet*, August 2nd.

³ *Lancet*, April 5th.

⁴ *British Medical Journal*, August 2nd.

⁵ May 10th.

⁶ *British Medical Journal*, June 14.

⁷ *Glasgow Journal*, March.

⁸ *Dublin Journal*, June.

⁹ Clinical Society, May 9th.

¹⁰ *British Medical Journal*, August 30th.

¹¹ *Lancet*, February 9th.

¹² *British Medical Journal*, March 1.

Congress. Mr. Reeves¹ advocates early colotomy. Cases of excision of the rectum are related by Mr. Harrison Cripps² and by Dr. Kelbourne King.³

The introduction of the operation of radical cure of hernia by anti-septic excision of the sac and suture of its neck has everywhere caused great activity in this department. An important discussion took place at the Dublin Academy of Medicine as a sequel to papers read, on Jan. 11th, by Messrs. Stokes, J. K. Barton, and Kendal Franks.⁴ Another debate took place at Liverpool.⁵ Dr. Charles P. Ball (Dublin) twists as well as ligatures the neck of the sac, and reports cases.⁶ Mr. Mitchell Banks⁷ and Mr. Bernard Pitts⁸ also write on the radical cure. Mr. Bryant has a practical paper on the management of irreducible hernia.⁹ The chief point is that when he orders a hollow pad truss, he has it moulded to a plaster of Paris cast of the hernial tumour. Mr. Golding Bird relates two cases of hernia *en bissac*.¹⁰ Mr. Edmund Owen notes a case of that rare occurrence, strangulated femoral hernia in a child.¹¹ Mr. Treves has a paper on "certain forms of intestinal obstructions that may follow hernia."¹² An interesting discussion followed. Mr. Keetley reports a case of spontaneous rupture of all the coverings of an inguinal hernia, in which the patient walked a long distance, supporting his intestines with his hands.¹³ This patient not only made a good recovery, but has had his rupture radically cured by ligation of the sac and suture of the rings. Mr. Jordan Lloyd writes a critical paper on the peculiar form of hernia termed "congenital umbilical," and relates a case treated successfully by compression.¹⁴

Dr. Cayley and Mr. Pearce Gould¹⁵ relate a notable case in which gangrene of the lung was treated successfully by incision and drainage.

¹ *British Medical Journal*, June 28.

² Clinical Society, April 28th.

³ *British Medical Journal*, June 28.

⁴ Reported in the *Dublin Journal* and in the *Medical Press and Circular* of immediately subsequent dates.

⁵ *Lancet*, January 5th.

⁶ *British Medical Journal*, September 6th.

⁷ *Medical Times and Gazette*, July 5th and 19th.

⁸ *Medical Times and Gazette*, March 1st.

⁹ Medical Society, February 16th.

¹⁰ *Lancet*, May 31st.

¹¹ *Lancet*, June 14th.

¹² Harveian Society, March 20th.

¹³ *Lancet*, August 16th.

¹⁴ *Birmingham Medical Review*, April.

¹⁵ Medical and Chirurgical Society, May 27th.

On the same occasion Dr. Cerit Y. Biss read a paper on "the treatment of pus-secreting basic cavities by the method of paracentesis and free drainage." A very interesting discussion followed these papers. Mr. T. P. Teale relates a case¹ in which he successfully incised and drained a pulmonary abscess, and adds some practical remarks of great value. At the Clinical Society² a discussion on the operative treatment of empyæma followed a case related by Dr. De Havilland Hall.

Mr. Henry Morris gives a good systematic description of the methods of performing "the now recognised operations" on the kidney.³ Mr. Greig Smith has a paper on the fixation of movable kidney by scratching its capsule through the loin;⁴ and Mr. Clement Lucas writes on injuries of the kidney.⁵ Mr. Lawson Tait has a paper on the surgery of the kidney.⁶ Mr. Powers⁷ and Dr. Macewen⁸ relate cases of nephrectomy. Sir Henry Thompson, in lectures delivered at the College of Surgeons,⁹ deals with internal urethrotomy, tumours of the bladder, digital exploration of that viscus and other interesting subjects. Mr. F. T. Paul, of Liverpool, has an excellent and complete paper¹⁰ entitled "A Classification of the New Growths of the Urinary System," and based on the observations of a committee of the British Medical Association. Mr. Henry Morris describes a case of removal of a vesical papilloma through a perinæal incision.¹¹ The tumour was not removed till a few days after the perinæum had been incised, and, in the meantime, spontaneous expulsion of the tumour had taken place, greatly facilitating its tying and removal. Mr. R. Harrison¹² publishes a case of removal of scirrhus of the prostate. Sir Henry Thompson describes an improvement in the aspirator for washing out the bladder.¹³ This consists of a small wire valve to stop the return of debris. Dr. Patterson relates an extraordinary case of spontaneous expulsion of an immense calculus through a rupture in the perinæum.¹⁴ The patient recovered. The stone weighed fourteen and a half ounces, exclusive

¹ *Lancet*, July 5th.

² January 25th.

³ *Lancet*, March 15th and 22nd.

⁴ *Lancet*, July 5th.

⁵ *Lancet*, April 19th and 26th.

⁶ *Birmingham Medical Review*, July.

⁷ *Lancet*, January 5th.

⁸ *Glasgow Medical Journal*.

Reported in the *Journal* for June.

⁹ *British Medical Journal*, January 12th.

¹¹ *Lancet*, April 26th.

¹² *Lancet*, September 20th.

¹³ *Lancet*, April 12th.

¹⁴ *Glasgow Medical Journal*, June.

of a piece chipped off by the patient with a chisel while the calculus was in the bladder, the chisel having been passed through a sinus in the perinæum! If this be correct, the stone was about the heaviest ever removed without a fatal result. Mr. Rawdon¹ has a case of cystotomy for strumous cystitis. Bladder symptoms were relieved, but death occurred from tuberculous disease of kidney. Dr. W. J. Collins² and Dr. Solomon Smith³ write on washing out the bladder. Mr. R. Harrison warmly advocates an exploratory perinæal incision in all cases of ruptured bladder.⁴ Mr. Cadge⁵ relates an instance of that very rare condition, sacculated bladder in the female. As the sacculus contained a calculus, the combination of circumstances was perhaps unique. Sir Henry Thompson,⁶ a month afterwards, shewed what he claimed to be a similar specimen. Mr. T. Smith and Mr. Black questioned Sir Henry Thompson's dictum concerning the nature of his specimen. Dr. W. Alexander describes another case.⁷ The literature of stricture has been particularly prolific. Mr. J. W. Teale gives three cases of, respectively (1), chronic dyspepsia (2), excruciating pain in kidney, and (3) vesical irritability with tenderness of prostate—all due to unsuspected stricture and cured by dilatation. He advocates Lister's bulbed sounds and dilatation to No. 10 or 12 at one sitting. Mr. John Duncan⁸ read a paper at Edinburgh on traumatic stricture, in which he related a case of impermeable stricture in which he opened the bladder above the pubes, and then passing one instrument into the urethra from behind and another from before, united the two by a median perinæal incision. A discussion followed, in which Messrs. Chiene, Joseph Bell, Miller and others took part. Dr. W. Alexander records a case in which the urethra was impaled during the attempted reduction of a fracture of the femur.⁹ Mr. Walter Coulson relates his experience of internal urethrotomy¹⁰ and reviews the different methods of performing that operation. Dr. G. Herschell describes his urethrograph.¹¹ An immense

¹ *Lancet*, February 2nd.

² *Lancet*, February 2nd.

³ *Lancet*, March 22nd.

⁴ *Lancet*, May 3rd.

⁵ *Lancet*, January 5th.

⁶ Pathological Society, February 9th.

⁷ *Liverpool Medico-Chirurgical Review*, July.

⁸ *Edinburgh Medical Journal*, August.

⁹ *Liverpool Medico-Chirurgical Review*, July.

¹⁰ *British Medical Journal*, September 20th.

¹¹ *Lancet*, April 20th.

amount of attention and discussion has been excited concerning the pyrexial and other evil conditions so frequently caused by catheterism. Thought has been directed into this channel mainly by a paper of Sir Andrew Clark's, read at the Medical society last winter. Discussions have taken place, not only in London, but also at Edinburgh,¹ Glasgow,² and elsewhere. Mr. J. Ogilvie Will has an excellent article on this subject in the *Lancet*.³ Examples have been related by Mr. J. St. J. Clark, and Mr. Stovey, respectively, of two of the most recent advances in the method of amputating the penis, namely, Pearce Gould's⁴ and Thiersch's.⁵ Mr. Southam describes a case of cure of congenital hydrocele, in a patient aged 18, by ligature of the neck of the sac, etc.

Mr. Butlin contributes an interesting paper on malignant tumours and "parasitism."⁶ The possibilities and probabilities of the connection are ably discussed, and the author inclines to the belief that malignant tumours are caused through the agency of micro-organisms. The same author also writes on cysts and cystic tumours of the breast.⁷ Mr. Lambert Ormsby⁸ relates instances of "traumatic malignancy." Mr. Roger Williams publishes analytical tables of an immense number of cases of tumors (10,000).⁹

With regard to the special "anti-germ" armamentarium, the spray has received the scientific attention of Mr. John Duncan¹⁰ and Professor Chiene.¹¹ The former treats the subject clinically, having already published experiments on it. Professor Chiene describes experiments which tend to refute much that has been asserted concerning the worthlessness of the spray. The discussion which followed Professor Chiene's paper (read at the Edinburgh Medico-Chirurgical Society) is remarkable for its frank and fair spirit.

Everywhere throughout the country, surgeons seem to be searching for some simpler and cheaper form of dressing than the eight-fold carbolic gauze, etc. The antiseptic agent most in favor has been mercuric

¹ *Edinburgh Medical Journal*, April.

² *Glasgow Medical Journal*, March.

³ April 26th.

⁴ *Lancet*, April 26th.

⁵ *Lancet*, January 12th.

⁶ *Lancet*, January 12th.

⁷ *Lancet*, March 29th and April 26th.

⁸ *Lancet*, July 26th.

⁹ *Lancet*, May 24th, etc.

¹⁰ *Edinburgh Medical Journal*, April.

¹¹ *Edinburgh Medical Journal*, August.

perchloride. Mr. Keetley has called attention¹ to the advantages of the system of uniting the deeper parts of wounds and the individual structures and tissues by buried sutures of catgut. This, which must be considered one of the greatest advances that have been made in the surgery of wounds for a long time, has hitherto remained almost unheeded in the British islands. Doubtless the recommendation of Es-march and Küster, at the late Berlin Congress, will soon have weight here.

Messrs. Gould and Hadden's cases of "obliterative arteritis"² and Mr. John Fagan's papers on the excision of strumous cervical glands are worthy of mention.³ Mr. Keetley has shortened the long, lax quadriceps extensor muscles in two cases of infantile paralysis, by resecting complete transverse segments cut obliquely from before backwards about one and one-half inch long, and uniting the separated fragments by numerous "buried" cat-gut sutures. Regarded as a mere operation, nothing could have been more satisfactory than the result. But not much, if any, advantage has resulted to the patients. Perhaps the result would be better in cases where the degeneration was less advanced than it was in these cases, and the muscles could be got to respond to galvanism. Mr. Bennett May publishes a thoughtful paper on a case of simultaneous ligation of the common carotid and the axillary arteries for innominate aneurysm.⁴ Mr. J. Paul Bush reports shortly twelve cases of ligation of the main arteries.⁵ Mr. Sampson Gamgee describes his new "artificial absorbent sponge."⁶ Inspector General Lawson enumerates the principles of the construction of stretchers, ambulance-wagons, etc.⁷ Mr. Hector Cameron gives the history of various "rare surgical diseases and accidents."⁸ Sir Spencer Wells writes on early and late operations for the removal of abdominal tumours.⁹ Mr. Lawson Tait publishes a paper on "Hydro-, Pyo-, and Hæmato-salpinx."¹⁰ Mr. Rushton Parker describes a case of gun-breech and bolt removed from the nose after five years (weight

¹ At the meeting of the British Medical Association, Belfast, July.

² Clinical Society, February 8th.

³ *Dublin Journal*, June.

⁴ *Lancet*, June 14th.

⁵ *Bristol Medico-Chirurgical Review*, June.

⁶ *Lancet*, Vol. 1.

⁷ *Lancet*, July 19th.

⁸ *Lancet*, May 10th, 17th, etc.

⁹ *Medical Times and Gazette*.

¹⁰ *Medical Times and Gazette*, September 6th.

three and one-half ounces).¹ Mr. Greig Smith writes practically on ingrowing toe nail.²

To sum up, it may be said that in urinary surgery, and in the operation of gastrostomy, exceptional activity has been seen; that surgeons are beginning to think that, having conquered the abdomen, it is time to attack the chest, and that those surgeons who take especial interest in the surgery and pathology of the bones and muscles have not been idle. There are also scattered indications of the utilization of the doctrine of cerebral localization in the diagnostic and practical treatment of injuries of the head. The spray has been eagerly discarded by many, cautiously and in part dispensed with by some, and adhered to as firmly as ever by a faithful few. Without expressing any opinion whatever on what is, in view of the conflicting evidence of such able experimenters as Messrs. Chiene and Duncan, still an open question, the following anecdote may serve to illustrate the average opinion in Great Britain on the subject: Entering the shop of one of our leading instrument makers, a surgeon found it crowded with steam-sprays of all kinds. "What!" exclaimed he, "I thought these things were going out of fashion." "So they are," replied the instrument-maker; "these sprays are for India, where they are just coming in. India is always several years behind us." Is the question of the spray after all merely one of fashion?

In the UNITED STATES, the most notable additions to surgical literature, made during the year, have been two volumes of the International Encyclopædia of Surgery, Vols. IV. and V., which bring this great work nearly to its completion. A volume of lectures on the Principles of Surgery, from the pen of the late Prof. Van Buren, edited by Dr. L. A. Stimson, has also appeared. A Treatise on Massage by Dr. Douglas Graham, is also worthy of special notice on account of the comprehensive and judicial manner in which the subject is treated. The best criteria of the progress of surgical science in this country are, perhaps, to be found in the proceedings of the more prominent and representative societies, under the stimulus of which most of the briefer contributions to literature are produced, which report the results of original investigations, or embrace facts and themes of greater or less

¹ *Liverpool Medical Journal*, July.

² *Bristol Medico-Chirurgical Review*.

novelty. The number of clinical reports made to journals and societies concerning single cases, or series of cases, has been very great. Detailed reference to them is impossible, yet nothing shows more strikingly than these the courage, skill, patience and command of resources of the American surgeon.

Of the more formal papers, it is fitting that the first mention should be made of the communication on "Wounds of the Intestines," by the late venerated Professor S. D. Gross, to the American Surgical Association, in which he embodied the ripe fruit of his long experience in relation to this important subject. The chief feature of this paper is the discussion of the diagnosis and treatment of these injuries. The main difficulty in diagnosis relates to those cases in which there is no protrusion of the wounded viscus, nor discharge of fecal matter, bile or mucus through the wall of the abdomen. In such cases there must be doubt as to whether the bowel be wounded or not. Shock and pain are of little or no value in coming to a decision, the most important signs in the affirmative being tympanitis, and a discharge of blood through the anus. Tympanitis, never circumscribed, is perhaps the most reliable symptom; the sooner it appears the greater its value. It may be entirely absent when the wound of the bowel is a mere puncture. Similarly, the shorter the time of appearance of a discharge of blood by the anus, the more conclusive does it become as a sign of injury to the bowel. In regard to treatment, two indications are to be subserved, prevention of fecal effusion, and the warding off of peritonitis. After reviewing the methods proposed to avoid the first danger, he announces the unqualified dictum that all wounds of the bowel, however small, should be sutured. The continued and interrupted suture, with Lembert's and Gely's modification of the latter, are approved, the preference being given to the interrupted suture, with strong silk as the material, carried into the wall of the bowel but not embracing the mucous membrane. Cleansing should be accomplished with a syringe and warm water, finishing with a solution of corrosive sublimate, 1-1000, and the injured bowel returned. In gunshot wounds of the bowel it is the surgeon's duty to open the peritoneal cavity, suture or excise the injured portion, and cleanse thoroughly. This paper constitutes the author's final contribution to American Surgery, of which

for so many years he has been the most prominent and striking figure. In him we admire a life rare in its completeness, and crowded to the utmost with useful labor.

As a companion to the paper just referred to should be mentioned a report of original investigations on "Gunshot Wounds of the Small Intestines," being the address of the Chairman of the Section on Surgery and Anatomy in the American Medical Association, C. T. Parkes, of Chicago. It embraces a detailed account of the pathology and treatment, with results, of thirty-seven gunshot wounds produced upon anæsthetized animals. It is full of interest, and an important contribution to the literature of abdominal surgery. The author summarizes as follows:

"1. Hæmorrhage, following shot wounds of the abdomen and the intestines, is very often so severe that it cannot be safely controlled without abdominal section; it is always sufficient in amount to endanger life by secondary septic decomposition, which cannot be avoided in any other way than by the same treatment.

2. Extravasations of the contents of the bowel after shot injuries thereof are as certain as the existence of the wound.

3. No reliable inference as to the course of a bullet can be made from the position of the wounds of entrance and exit.

4. The wounds of entrance and exit of the bullet *should not be disturbed* in any manner, except to control bleeding or remove foreign bodies when present. They need only be covered by the general antiseptic dressing applied to the abdomen.

5. Several perforations of the intestines, close together, require a single resection, including all the openings. Wounds destroying the mesenteric surface of the bowel always require resection.

6. The best method of uniting the wounded intestine after resection is by the use of fine silk thread, after Lembert's method. It must include at least one-third of an inch of bowel tissue, passing through only the peritoneal and muscular coats, never including the mucous coat. The everted mucous membrane must be carefully inverted, and needs no other treatment.

7. Wounds of the stomach, small perforations and abrasions of the intestine, can be safely trusted to the continued catgut suture.

8. Every bleeding point must be ligated or cauterized, and especial care devoted to securing an absolutely clean cavity.

9. The best method of treating the stumps of divided mesentery is to make the separation through the intestinal walls three-eighths of an inch on either side of the mesenteric attachment, tear away the mucous lining of the retained strip of bowel, and draw the peritoneal surfaces thereof together by the continued stitch.

10. *Primary abdominal section* in the mid-line gives the best command over the damage done, and furnishes the most feasible opening through which the proper surgical treatment of such damage can be instituted. Further, its adoption adds but little, if anything, to the peril of the injury.

The want of space forbids more than a mention of the important paper by Professor Moses Gunn, of Chicago, on "The Philosophy of Manipulation in the Reduction of Hip and Shoulder Dislocations," and also of the valuable paper by Professor W. T. Briggs, of Nashville, on "The Surgical Treatment of Epilepsy arising from Injuries of the Head, with special reference to the use of the Trephine." Both of these were read at the meeting of the American Surgical Association. Of the papers presented before the surgical section of the American Medical Association, special mention should be made of one on "Branchial Cysts of the Neck," by Dr. N. Senn, of Milwaukee, and of one by Professor Dennis, of New York, on "The Treatment of Compound Fractures."

For the amount and quality of the work done by its members, the New York Surgical Society enjoys a deserved reputation. Of the contributions made through this society the following may be mentioned: By Professor H. B. Sands, on "Internal Œsophagotomy in the Treatment of Simple or Cicatricial Stricture." By means of an instrument similar in mechanism to certain urethrotomes, a division of those Œsophageal strictures, which are narrow, permeable, and undilatable, is recommended; the recommendation being supported by a successful case. By F. Lange, "A New Method of treating Large Bony Cavities in the lower end of the Femur in Adults." The method consists of fastening a flap of the soft parts to the bottom wall of the bone-cavity, after its anterior wall had been removed, and its surface had been thor-

oughly refreshed and purified. By Professor T. M. Markoe, on "Sarcoma of Synovial Sheaths;" and by Professor E. L. Keyes, on "The Geographical Distribution of Urinary Calculus."

Before the New York Academy of Medicine Dr. Robert Abbe discussed the subject of "Dupuytren's 'Finger Contraction,'" upholding its nervous origin, excited by local traumatism.

Before the Philadelphia County Medical Society, Dr. J. B. Roberts read a communication on "Trephining in Injuries of the Head," in which he advocates that in all subcutaneous injuries of the head, with possible fracture, an immediate exploratory incision in the scalp should be made. In all instances of depressed fracture, with possible existence of splintering and spiculation, the trephine should be immediately applied.

From the pen of Professor Roswell Park, of Buffalo, have appeared two important communications, one on "Fat Embolism,"¹ and one on "Tuberculosis of Bones and Joints, and its treatment by Ignipuncture."²

The subject of "Rectal Etherization" has received some attention in this country, but the evidence thus far is decidedly adverse to its frequent employment, it having caused ulceration of the intestine and death in two cases.

One of the most prominent features in the yearly progress of American Surgery is the increasing use of antiseptic methods and appliances.

This statement is not invalidated by the diversity of methods employed in actual practice. The principles and theory of antiseptics have formed the foundation of the various modifications and revisions of wound treatment, all tending toward simplification, and thus greater facility, in technique. Although opinions vary as to the ultimate truth of the theories of antiseptic surgery, yet few venture to deny the benefits resulting from its practice. In this connection may be noted the following papers as being of great interest:

By R. F. Weir, before the New York Academy of Medicine, "Antiseptic Dressings as used in the New York Hospital," in which he reports the exceedingly favorable results obtained by using corrosive

¹ *New York Medical Journal*, Aug. 16, 1884.

² *The Medical News*, Aug. 30, 1884.

sublimate as the principal antiseptic. Catgut soaked in a watery solution of corrosive sublimate and preserved in absolute alcohol was used both for ligatures and sutures, the continuous suture being preferred. Rubber or decalcified bone tubes were used for drainage. As dressings, fine jute, moss, wood-wool and peat, made into pads, were utilized.

By Frank Rockwell, of Brooklyn, on "Antiseptic Surgery in Private Practice," to show those who deem a cumbrous and complex apparatus necessary for antiseptic treatment, that within a small compass all the materials pertaining to a modified antiseptis can be obtained. Corrosive sublimate in concentrated solution, carbolic acid, iodoform, naphthalinated gauze, catgut and disinfected Chinese silk, embrace the essential features of this modified practice. His results have been highly satisfactory.

By G. R. Fowler, of Brooklyn, on "Antisepsis in Hospital Practice," advocating wood-flour, disinfected with corrosive sublimate, and having mixed with it powdered naphthaline, made into pillows for use as dressings, the naphthaline being almost a specific against erysipelas.

By L. S. Pilcher, of Brooklyn, on "Recent Advances in Methods of Wound-Treatment." He urges the use of "aseptic instruments," that is instruments so constructed as to leave no crevices or joints where impurities may find lodgment. Another step in advance is the use of "buried sutures," consisting of a series of catgut sutures applied to the deeper parts of an extensive wound, by which the layers of tissue, one after another, are apposed from the bottom of the wound upward, the sutures being absorbed during the process of healing. This writer also lays special stress upon the value, for dressings, of turf-moss, and ordinary fine sawdust disinfected with corrosive sublimate and made permanently antiseptic with naphthaline.

The latter three papers were read before the Medical Society of the County of Kings.

With regard to gynecological surgery, the year 1884 has not been made notable by any great contributions. It came in with the shadow of the death of Marion Sims resting upon it, and the originating impulse, the rare suggestiveness of that master mind, has been sadly lacking. But while nothing very new has appeared, there have been a

number of valuable contributions, mainly to our clinical knowledge and in criticism of current theories. Noteworthy among these was the discussion at the New York Academy of Medicine, and subsequently continued in the Journals, on the Pathology and Treatment of Puerperal Fever. Although starting as an obstetrical debate, it has involved questions of Pathology of the most immediate interest to the gynecologist.

In the field of plastic surgery Emmet's operation for restoration of the lacerated cervix has been more firmly established by the publication of several extensive series of cases, while in England our brethren seem at last to be beginning to recognize its value. On the other hand the accepted operation for repair of the torn perineum has been subject to modification at the hands of several surgeons. It has been proposed to employ only a single suture, or at most three, to unite the denuded surfaces. In the main, however, these modifications have not met with favor, and deservedly so.

A large and increasing portion of the attention of gynecologists has been devoted to the various operations with which the names of Battey, Hegar and Tait are associated. The clinical reports of cases have been very numerous, and the general tendency of professional opinion has been in favor of enlarging the scope of these procedures. This tendency has received additional impetus among us from the visit to America of Mr. Lawson Tait. But there has been good ground for the criticism that these operations have been far too hastily undertaken in many cases, and sometimes by men not justified, either by their results or their previous training, in doing them.

The operation of shortening the round ligaments for backward displacements of the uterus, introduced by Mr. Alexander, of Liverpool, and so successful apparently in his hands, does not appear to have met with the attention it deserves in this country.

The Necrology of American Surgeons has been swelled by the two distinguished names, S. D. Gross, of Philadelphia, and Willard Parker, of New York. It would be a work of supererogation to enlarge upon their respective characteristics. Their works live after them in printed page, and in the memory of friends, pupils and clients.

To review the methods and management of the leading American

hospitals would be impossible within these limits, but it may be said that there is a growing tendency toward "continuous" service.

In GERMANY, 1884 has been quite an eventful year, and much of interest appears reflected in its surgical aspect above and beyond those new communications of special interest to the surgeon, which are deposited in a lasting form in the various periodicals of surgical literature.

The most important features in the year's transactions have been the meetings of the different medical bodies, and the part taken by German science in the International Congress.

Especial attention is commanded by the thirteenth meeting of the German Surgical Society, held at Berlin from April 16th to 19th, closely preceding the third annual Medical Congress held in the same city, for the avowed purpose of uniting with it the celebration of the 25-years' occupancy of the chair of clinical medicine at that university by Prof. Th. Frerichs, who was also elevated on this occasion to the rank of nobility.

In this Congress, papers of general pathological interest were read by Neelson, of Rostock, Schüller, of Berlin, and König, of Göttingen. The former spoke on septic diseases, and pointed out that the experimental septicæmia of Koch and Pasteur, being a pure acute mycosis of blood, had nothing to do with the septicæmia resulting from the infection of wounds; the latter was caused by one or all of three quite different agents—by absorption of products of putrefaction, by a "toxic" mycotic disease of the blood entirely different from the experimental one, and a simple purulent inflammation induced by pyogenic organisms. This septicæmia might be imparted to the system by the lymphatics, or through thrombosis and embolism by the venous system, and again was in no way related to pyæmia—this latter disease being of a specific mycotic nature, and liable to arise without a wound or a suppurating surface, or as a complication either of a fresh wound or of any existing form of septicæmia.

Schüller showed that in cases of metastatic inflammation of joints not all such inflammations could be considered to be of the same specific nature as the primary disease, since micro-organisms of the kinds looked for were not always present in the tissues.

König stated that the danger that a tuberculous inflammation of a

joint might induce general tuberculosis of the system, should not form an indication for excision; on the contrary, there was more danger of inoculating the disease into the system by operation.

An interesting paper was read by Jul. Wolff, of Berlin, showing that the transformation in the structure of the spongiosa, in the course of pathological changes in the bones, could be traced back to certain laws (of an orthogonal system of beams); and that in fractures in the process of healing, in rickets, etc., the same structures could be observed in similar cases.

In special pathology, Albrecht, of Brussels, read a paper on malformation of the upper jaw, advancing a theory of the existence of four intermaxillary bones, two on each side; which subsequently gave rise to an extended controversy in periodical literature.

Valuable contributions to operative surgery were made by Madelung, of Rostock, on rhinoplastic operations; by Hahn, of Berlin, and Schede, of Hamburg, on extirpation of the larynx; by Czerny, on excision of the pylorus; Schede and Madelung, on colectomy; each adding cases and histories.

Two cases of extirpation of the spleen were discussed (Credé and V. Hacker), and an interesting debate followed Neuber's paper on excision of the hip and knee-joints.

Operative technique was dwelt upon by Küster, of Berlin, who spoke of buried sutures; by Mikulicz, of Kraken, on compression as a means of staunching bleeding wounds; and Neuber, on using decalcified tubes when suturing the intestine.

Antiseptic surgery was represented by Mikulicz, who preferred the use of carbolic acid to sublimate for open wounds; Bruns, of Tübingen, spoke in favor of his dressings with sublimated wood-wool, and of a new product, wood-cotton; and Leisrink, of Hamburg, demonstrated plates of sublimated compressed turf-moss for dressings.

A more detailed account has been given of this Congress for the reason that it very fairly represents the separate features as well as the entire drift of German surgery throughout the year. For in literature we find the greater number of the more remarkable communications written on the same subjects by the same authors; while in the Copenhagen International Congress the German surgeons dwelt mostly on the sub-

ject of wound-dressings, Esmarch recommending his "*Dauerverband*;" von Mosetig-Moorhof, of Vienna, the treatment of all wounds; Mikulicz, those involving cavities lined with mucous membranes, with iodoform; Schede favoring corrosive sublimate; Koeberlé, of Strassburg, simply pure water for wounds; and Neudörffer, of Vienna, showing by scientific deductions how an aseptic course could be ensured by any of these modes of treatment.

The fifty-seventh annual meeting of German scientists and physicians at Magdeburg took place on the eighteenth September, where many interesting subjects were discussed by leading surgeons of Germany; litholapaxy and extirpation of kidneys, by Prof. von Bergmann; the position of the limbs in joint disease by Lücke; excision of the pharynx and œsophagus, and colectomy by Mikulicz; and other topics by Volkmann, Madelung, Küster, Hahn and Schede.

At the beginning of September an international convention of Otologists was held in Bâle, being very fully attended.

Early in the year the second volume of the *Mittheilungen aus dem Kaiserlichen Gesundheitsamte* appeared, which contains, besides many other valuable investigations, Koch's papers on the ætiology of tuberculosis, which characterizes this book as the most important scientific production of the year. The president of this institution, Geh.-Rath Struck, resigned on the 15th of September, and Geh.-Rath Koch took temporary charge.

Chairs of bacteriology were instituted in Munich and in Wiesbaden, and bacteriological laboratories were organized during the year, in combination with the clinics of numerous universities.

A movement was made early in the year in Prussia to effect a disciplinary control by a medical board, chosen for the purpose and sanctioned by the State, over medical practice; but, although a similar institution had obtained in Baden, the medical societies in North Germany effectually protested against any such innovation.

In Leipzig the chair of general pathology was made vacant by the death of Prof. Julius Cohnheim, occurring on the 15th of August, after a protracted illness of nearly fifteen years' duration, of the nature of gouty kidney, and in the forty-fifth year of his life. He first attained to eminence as an assistant of Virchow, when he published his researches

on the nerve-endings in the cornea, and, later on, on the emigration of white blood-corpuscles in inflammation, both times using new methods of investigation. The latter work is the most important of his life. From Kiel, where he first occupied a position of lecturer, and where he made his researches on embolism, he was called to Breslau to fill the chair of pathology; here he wrote the first part of his famed work, "Lectures on General Pathology;" as a follower of Traube, he in the most genial manner interpreted pathological phenomena, and advanced many new theories alike conspicuous, even if some have proved untenable, for ingenuousness of argument and fairness of criticism, qualities which were prominent in his personal character. Called to Leipsic in 1878, he there finished this work and edited the second edition, and published his pamphlet on the infectious nature of tuberculous disease, which was a forerunner of Koch's discovery. He died universally beloved for his amiability and strength of character, and leaves many followers of his methods and intentions.

Of the very numerous literary events of the year, we can mention only the more important.

As in the clinics, a great contingent of German literature was formed by bacteriological researches; besides the most excellent of these, mentioned above, Becker, of Berlin, claimed to have found the specific coccus of acute osteomyelitis, which was subsequently questioned by Rosenbach, of Göttingen, and Krause, of Halle. Kammerer of Freiburg, found the specific coccus in gonorrhœal inflamed joints. The "pneumococcus," of Friedländer was further investigated by himself, by Von Mátray, of Vienna, and Frobenius of Munich, with satisfactory results as regards inoculation. Neisser advocated the theory that syphilis was produced by a specific bacterium; O. Israel first cultivated the actinomyces-germs. Baumgarten histologically examined tuberculous processes. Doutrelepon and Jarisch wrote on skin-tuberculosis, and Müller, of Göttingen, examined the tubercle-bacillus in diseased joints.

Tuberculosis of joints was the subject of many writings also in operative surgery, among which König's book, based on Koch's theory is prominent, and Albrecht who advocates primary amputation in disease of the foot, expectant treatment of the knee and hip-joint,

and exsections in the upper extremity. The other subjects in operative surgery comprehend exsections of the tarsal bones (Mikulicz, Goldschmidt, Vogt); surgical operations of the intestinal tract (Gussenbauer, v. Bergmann, Kocher, Czerny, Maurer, Maydl, Mikulicz, Reichel, Socin); of thyroid tumors (Kocher, Rehm, Olalinski) and the larynx (Gottstein, Preetorius, Leisrink, Magdl, Holmer); of the lungs (Lauenstein, Albert, Krönlein), and pleura (Schäla, v. Puky, Escherich); of gynecological import (Gusserow, Kaltenbach, Küster, P. Müller, Sander, Stande). Text-books appeared on skin-diseases (v. Ziemssen's *cylopædia*) and parts of Hüter's *Surgery* (Lossen), v. Recklinghausen (pathology); W. Heinicke (operative surgery); Jössel (topographical anatomy); Kolaczek (surgery); and a pamphlet by Esmarch (on methods of clinical teaching). Many valuable statistical reports from different hospitals, and on diverse surgical topics, appeared, many of which have to do with antiseptic wound-dressings, contributions to which were also made by Hagedorn, Leisrink, Mielck, Korach (on turf-moss), Balser (on carbolic acid), Taenzer and Bokelmann, (on the gynæcological use of corrosive sublimate), Starcke (on exsiccation of wounds), Socin and Rauch (zinc oxide), R. de Fischer (cellulose-tablets); while in therapeutics much has been written on massage (Reibmayr); injections of corrosive sublimate have been recommended for inflamed joints (Vogt), and injections of osmic acid for neuralgia (Fränkel, Szumann, Eulenberg), of arsenic for tuberculous inflammation (Landerer, Stinzing, Buchner). New antipyretics have been introduced (Fileline, Gutmann), kairin being superseded by antipyrin, both having called forth numerous communications. Papayotin, a digestive ferment, was introduced by Rossbach as a method of absorbing malignant tumors by injection; and Glaewcke recommended subcutaneous injections of iron.

In FRANCE, the year has not been so prolific. Within the memory of very many men in the profession, France led the world in all that pertained to surgery. No surgical education was considered complete which did not include a period of study in Paris. But all that was changed long ago, and the practitioner who finds American opportunities insufficient for his professional training is almost certain to turn his footsteps towards some other foreign land than France. The opinion that Gallic surgery has been outstripped in the race is entertained even

by many Frenchmen, and finds not infrequent expression, sometimes directly, but most frequently, as is natural, by implication, as when Pozzi, arguing for a national congress, exclaims, "Who knows but that, from this community of effort and this unity of conduct, there may be born a great movement which shall give to French surgery a more definite character and a powerful influence." Again, in a recent republication of a French work, first issued in the sixteenth century, the editor, speaking of the reasons which had induced him to undertake the revival of an almost forgotten classic, says, "It has seemed proper to remind the erudite world that, from the renaissance to the present hour, French surgery has never laid down its arms, and that it was producing masterpieces when its rivals of to-day had no existence, even in name. The audacity with which, in certain countries, our present scientific glories are being contested, forces us to reassert the position which belongs to us, and to exhibit our titles of nobility." Here are, on the one hand, a tacit admission of the lack of definite character and acknowledged influence, and, on the other, a contemptuous assertion of superiority from one who affects to despise the works of certain others, because they are new, and accuses them of impudence in presuming to surpass the deeds of his ancestors. In the face of such utterances, the critic cannot be expected to find in the surgery of France during the past year much to excite enthusiasm. And yet, the careful reader of the reports of the transactions of French surgical associations and hospitals will discover abundant evidences of activity, records of admirable work, and occasional displays of such ability as to arouse wonder that a thing which can be so very good is not much better.

One of the most interesting incidents of the year is the proposal to establish an annual congress of French-speaking surgeons and the discussion of this project in the *Société de Chirurgie*, in Paris. The vivacity of the remarks against and in favor of the plan is extremely entertaining, and the almost unanimous vote to inaugurate the movement gives promise of noteworthy achievements in the near future.

The hold which the antiseptic method has taken among the French is indicated by one of the chief arguments made in favor of the formation of the congress. Formerly, it was said, there was far less need of such a convention; for the provincial surgeons never ventured to do any

operation which they could avoid, sending to the masters of the art at the capital all cases which did not require instant interference. But now the Lister method has given a safe footing on what always before was perilous ground, and all over the great empire men who, a few years ago, dreaded to perform an operation, have become successful surgeons. This is the more fortunate because the great extension of railroads, and the vast increase in manufactures and other enterprises in which machinery is employed, have been accompanied by an enormous augmentation of the number and severity of accidents which need immediate treatment of the most intelligent and skillful character. Here, however, as in all other countries, the conversion of the profession to the recognition of the role of septic infection in wound disturbances is by no means universal, and there are vigorous opponents of antiseptic surgery, who lose no opportunity to inveigh against it. But the evidences of improvement in results are too numerous and too weighty to be ignored, and the method is steadily and rapidly gaining ground.

The excision of a portion of each of a number of ribs for the cure of chronic empyema, frequently called the operation of Estlander, has been performed many times by various surgeons—Championnière, Perier, Ehrmann and others—with very satisfactory results, and the consideration of the procedure has occupied much time at the society meetings. Osteoclasts in the treatment of genu valgum has excited great interest, which has been displayed in animated discussions, led by Saint-Germain, Reclus, and Bouilly. Thomas reports a case of irreducible prolapse of the uterus, in attempting the reduction of which he produced a large rent into the peritoneal cavity. Immediately he encircled the body of the womb with an elastic ligature, and the whole mass sloughed off in due time, leaving merely the fundus, which was drawn up in the process of cicatrization, and formed the vault of the vagina. The patient recovered without a serious symptom, and the surgeon was so elated by the result that he concluded his report as follows: "The irreducibility of her prolapse was a veritable blessing, inasmuch as she has, on account of it, been cured of her infirmity. Nevertheless, I would not recommend treating all cases of this displacement by ablation of the uterine body; but, in certain cases of complete prolapsus, which is reducible, but where it is impracticable to keep the womb in place, the procedure

to which I resorted will be found very useful,"—a proposition which is rather startling, even in these days of daring gynecological surgery. Resection of the astragalus for tuberculous osteitis has been performed by several surgeons, and Robert has written a valuable paper on the subject, reporting a case in which there was only one centimeter and a half of shortening, and almost perfect function. Ollier proposes a new method for ablation of the astragalus. Finding the incision on the external aspect of the ankle insufficient for the easy extraction of the bone, he makes an incision on the inside, reaching the internal surface of the astragalus. The results are very gratifying, the deformity being slight, and the action of the parts excellent. In perineorrhaphy, Verneuil has abandoned the process of freshening the surfaces until they bleed, and, instead, applies caustic, inserting the sutures as soon as a good granulating surface is obtained, and getting fine results by secondary union. Others report success with this method, where the ordinary plan has failed repeatedly. Guermonprez contributes an able article on the prognosis in cases where there is great mutilation of the hand, and demonstrates anew what sometimes is not sufficiently borne in mind, namely, that a small portion of the hand may save a patient from beggary, and a single digit is of great value. Delahousse has found that a suppurating bubo can be cured in from six to twelve days, by evacuating the abscess and injecting into its cavity a one-to-six solution of chloride of zinc, which is allowed to remain a short time, and is then replaced by a full carbolic injection. Antiseptic dressing is applied, and in two days the former procedure is repeated. In abscess occurring in bone disease, Verneuil aspirates and throws in fifteen grams of ethereal solution of iodoform, one to five. Several repetitions of this performance are necessary, but the purulent secretion gradually ceases, and a cure is obtained in a few months. Labbe points out that the diagnosis between sprain of the ankle-joint and fracture of the fibula, sometimes a difficult matter, may be made by remembering that in peroneo-tibial sprain the ecchymosis is seen a little in front of the anterior border of the fibula, while in separation of the external malleolus it is behind the bone, in the depression which lies between it and the tendo achillis. Pollosson recommends a new operation for cancer of the rectum. Believing that some dangers of the usual procedure may

be avoided by complete quietude of the rectum before it is interfered with, he suggests forming an artificial anus, and entirely closing with sutures the portion of the bowel below the sigmoid flexure. After recovery from this step, the cancer is to be removed by the ordinary method.

It is clearly impracticable to mention all the points of interest which we have observed in the medical literature of France during the past twelvemonth, and those recorded above are presented merely as representative of the great number from which selection must be made. No nation should be expected to produce each year a masterpiece of surgery destined to set an example for all future time, or to give the world an invention which will immortalize a name; and it is no fit cause of surprise that France has not displayed great originality in any given year. But, while there are some French surgeons who are disposed to rely for their position upon the good name which they have inherited from a line of illustrious predecessors, there are, fortunately, others who have learned that the profession recognizes no aristocracy but that of merit. From men like these, equipped with intellect, education and energy, and surrounded by opportunities which are unsurpassed, we may fairly look for achievements which shall add a new lustre to the fame of French surgery.

PROCEEDINGS OF SOCIETIES.

NEW YORK SURGICAL SOCIETY.

THE first meeting of the New York Surgical Society for the season of '84 and '85 was held October 14. In addition to the paper by Dr. L. A. Stimson upon "The Origin of the Use of the Ligature in the Treatment of Aneurysm," which is published in full in this number of the ANNALS OF SURGERY, page 13, and the presentation of specimens and cases, this meeting was especially notable for the remarks of Professor Thomas M. Markoe on

CAPILLARY DRAINAGE IN THE TREATMENT OF WOUNDS,

the text of which was a specimen of recurring carcinoma of the arm. Dr. Markoe exhibited this specimen which had been removed from a lady past middle life, eighteen months after the removal of the breast, which had been done by a physician in Burlington, Vt. The tumor of the breast was probably carcinomatous. The patient remained well after amputation of the breast for about a year, and then began to complain of a great deal of pain in the left humerus. There was no special tumor of the humerus at any time, but there was increasing tenderness, and after the lapse of a few weeks, the bone became flexible and could be bent at almost a right angle. The patient came to the city, and Dr. Markoe removed the arm at the shoulder-joint by the ordinary operation, making a long deltoid and rather a short axillary flap. The healing of the wound was rapid and extremely satisfactory. The flexibility of the bone was found to have been due to a series of breaks at various points. Just below the neck there was a distinct fracture, which had been appreciated before the operation.

Dr. Ferguson had made the following report upon the specimen:

"The soft parts being partially removed, the left humerus is seen extensively involved by a new formation. There are two false points of motion—one just below the insertion of the deltoid, and another in the surgical neck. Tumor-tissue is seen distinctly in these locations at the expense of the bone. The muscles covering the front of the arm were

in part invaded by the tumor, which in its invasion of healthy tissues followed the planes of the fibrous tissue between the muscle-bundles. Microscopically it is a typical carcinoma."

Dr. Markoe said he had presented this case more especially to have an opportunity to say a word about a method of managing surgical wounds which had given him great satisfaction, and which he believed had not been so extensively recognized as it deserved to be. Surgeons had for years used capillary drains in the shape of horse-hair, in the olden times silk, and more recently the catgut leash, yet he believed that very few surgeons had much confidence in the method for large wounds, as it had been used commonly for small ones, and particularly for those of the scalp—a single thread or two of catgut being placed in the wound as a drain, the wounds thus treated doing extremely well. But a good many surgeons abroad, and some here, had used the method in the treatment of larger wounds, and had found it satisfactory. He had himself felt that the method had certain advantages which were worthy of attention. In the first place, it exerted a positive force in drawing out from the cavity of the wound any fluids which might be retained there. If the drain was in a dependent position, the capillary force exerted by the leash would be almost as powerful as that of a siphon. The moment it was applied it would be seen that drainage commenced, taking place along the sides and between the strands of catgut. The other features of the dressing, perhaps, presented nothing unusual, careful apposition being very important. Iodoform and bichloride gauze, with borated cotton externally, completed the dressing. Dr. Markoe then related some cases showing the advantages possessed by this form of drainage.

On June 18th he extirpated a recurrent tumor of the breast which had been removed about a year before. The axillary glands were very extensively involved, and this rendered free evacuation of that region necessary—so free that the sterno-clavicular articulation was felt with the finger during the operation. The wound was a very large one, and was drained with two capillary drains, each composed of six or eight strands, tied in the middle, the knot being then thrust into the deeper part of the wound. The double leash of threads projected from the wound about an inch. One of these drains was placed in the lower

and the other in the upper angle of the wound. The wound was brought together with catgut stitches dressed with iodoform and bichloride gauze, and covered over with cotton. The dressing was left on fourteen days, at the end of which time the wound was found to be perfectly healed from end to end. The finger, passed over the line of union, rubbed away the projecting strands of the drains and the unburied parts of the sutures. Not a drop of pus had formed, and the wound was so absolutely and soundly healed that no further dressing was applied.

On September 23rd he operated in another case for relapsing cancer of the breast, making a smaller wound and not opening the axilla, but applying the same kind of dressing. On the ninth day the wound was found to have healed perfectly.

September 24 he removed a cancerous breast of moderate size, in which a few of the axillary glands were involved, making a long incision necessary for their complete removal. The capillary drains were inserted, and on October 9th, the fifteenth day, when the dressing was removed for the first time, the wound was found to be completely healed without any formation of pus.

On the 25th of September he removed at the shoulder joint the arm which had been shown to-night. Two catgut drains were used, with the usual dressing. The gentleman under whose charge the patient was removed the dressing a little early—only thirteen days after the operation. In that case the wound was found to have healed perfectly except a little strip at one angle, at which there had not been perfect coaptation of the flaps. The wound, however, was very superficial, and, doubtless, would heal under another dressing.

On October 12th he performed another breast amputation, applying a similar dressing, and the wound had now completely healed except at one point, at which a clot of blood had rested between the lips of the wound.

He made these statements because, so far as his experience with this method had extended, it had led him to have the greatest confidence in it, and, while he did not maintain that it was applicable to all wounds, yet in those cases in which it was possible to obtain primary union he believed it to be better than any other form of drainage. The ordinary

India-rubber drainage-tube certainly always left a fistula. Neuber's tube, while it often acted well, securing perfect healing of the wound nearly throughout, still left one point open, and sometimes acted as a foreign body.

Dr. R. F. Weir had used the capillary drains, both of hair and of cat-gut, and, so long as the wound was fresh and the discharge serous, the capillary action had done well; but, so soon as the secretions became thick, it had not worked; the strands became glued together and the capillary action ceased. He knew this to have been the experience of many other surgeons also. He had employed the method in large wounds, as in breast amputations, and certainly had not been so well satisfied with it as with the rubber or bone drain. He wished to state, but not too positively, that he had some doubts even in regard to the bone drainage-tube. In one case recently in which the bone drainage-tube was employed, a septic condition developed, and he was strongly of the impression that it was due to the absorption of the softened bone. This was not a single instance, and from such cases he had learned to place more reliance upon the rubber drainage-tube than upon any other, although he recognized its great disadvantage in having to be removed from four to seven days after the operation, but by this time the risk of inflammatory reaction had pretty well passed. At any rate, he had not found any material risk to the patient from changing the dressing at that time and putting on the permanent one.

He had found that tubes prepared after the manner recommended by Neuber, in carbolized oil, were fragile; a needle passed through the end of them would cause them to split, and by the third or fourth day they would sometimes be found collapsed and would fail to act as drains. If kept in glycerine and alcohol, after Kocher's method, they would not split, and were more readily soluble; the ends would be found almost wholly absorbed within three or four days. If put in bichloride solution and alcohol, they lasted as long as from five to seven days.

Dr. Henry B. Sands thought the cases reported by Dr. Markoe afforded a striking illustration of the advantages of a dressing which offered no obstacle to union by first intention. He believed that, had the rubber drain been employed, the excellent results reported could not

have been obtained. There certainly would have remained for a time a granulating, if not a suppurating, tract along the course of the drainage-tube. He should say that, if it was probable that a wound would heal only by granulation, it would be desirable to use a rubber drain, but, if the case was one in which primary union might be anticipated, a soluble drain would be preferable. He did not feel quite certain as to the capillary action of the catgut drain. According to his experience, after it had been in place a short time, it became quite soft, the separate strands became agglutinated to one another, and capillary action was diminished or arrested. Regarding the comparative value of this and the decalcified-bone drainage-tube, he doubted whether the former possessed any superiority. He had obtained absolutely perfect primary union in amputation of the breast in a number of cases in which he had employed the decalcified-bone drain. He did not believe, however, that union without suppuration could be accomplished unless great pains were taken to secure perfect coaptation, not only of the edges, but also of the deeper surfaces of the wound. He should not expect to get union with any form of drainage, however perfect, if the surfaces of the wound were not in perfect contact. The bone drainage-tubes which he employed were prepared according to a method suggested by the apothecary of the Roosevelt Hospital. The oil was extracted by means of chloroform, and the tubes were afterward kept in alcohol. They were firm, and did not collapse so readily as when kept in carbolized oil.

STATED MEETING, OCTOBER 28, 1884.

DEFORMITY OF THE HANDS FROM CICATRICAL CONTRACTIONS, FOLLOWING EXTENSIVE BURNS.

Dr. A. C. Post presented a patient under treatment for complicated deformities of the hands from burns which were inflicted nearly two years ago. The patient was a young woman, who attempted by gas-light to wash with benzine long kid gloves which were on her hands and forearms. The benzine took fire, and the forearms and hands were very severely burned. She came under Dr. Post's care within a few weeks after the injury, but it was a long time before the burns were sufficiently healed to enable him to take any active measures to correct the deformities which they had occasioned.

Within the last year a series of operations had been performed chiefly to overcome the forced flexion of the fingers at the articulations between the first and second, and second and third phalanges. And these operations had been attended with a gratifying measure of success. The last operation was performed nearly seven weeks ago. It was designed to overcome an exaggerated extension or backward flexion at the metacarpo-phalangean articulations. It consisted in numerous oblique incisions across the back of the hands and fingers, extending through the whole thickness of the cicatricial tissue, and dividing it into small rhomboidal segments. The fingers were then forced into a bent position nearly at right angles, and held in that position by narrow splints of malleable iron, one for each finger, applied to the palmar surface of the fingers, hand and forearm, and held in place by strips of adhesive plaster and roller bandages. Before the splints were applied, the wounds were washed with a solution of mercuric bichloride, and dusted with subnitrate of bismuth.

The wounds were healed within twelve days from the time of the operation. The dressings have been repeated three times a week, passive motion being made freely at each dressing. For the last three weeks the splints have been left off for half a day before each dressing, and active and passive movements have been freely resorted to. The backward flexion of the phalanges has been entirely overcome, and the patient is regaining the use of the fingers. Dr. Post made the remark that in the division of cicatricial bands the wounds heal more rapidly, and with less irritation when a large number of incisions is made, than when the incisions are less numerous and with wider intervals between them.

EXTIRPATION OF GOITROUS TUMOR.

Dr. A. G. Gerster presented a patient, a female, twenty-four years of age, from whom he had removed, twenty days before, the right half of the thyroid gland which had been the subject of follicular hyperplasia. The tumor had been exposed by raising a flap involving the superficial structures, a method which the operator thought better than the usual longitudinal incision. Union by first intention had been secured in the operative wound.

OSTEOPOROSIS OF BOTH FEMORA—SPONTANEOUS FRACTURE.

Dr. L. A. Stimson presented specimens obtained, post mortem, from

a man fifty-one years of age, who was admitted to Bellevue Hospital October 16, 1884, and died October 23. He was a carpenter, and had always been robust and healthy until last winter, when he began to feel weak and suffer from aching pains in both thighs. The pain continuing, he ceased to work, but did not take to his bed. His strength diminished, and he lost flesh. The day before admission, while walking across the room, he caught his toe in the oilcloth, fell and was unable to rise.

On admission each femur was found to be broken at about the junction of the upper and middle thirds. He failed rapidly, without fever or complaint of pain, became dull, semi-unconscious, and died on the eighth day. Examination of the urine showed a specific gravity of 1.004, no albumen or casts. The autopsy revealed only a large stone in the pelvis of each kidney, which were shown, one weighing five ounces and six grains; the other, one ounce and four hundred thirty-two grains.

The portions of the femur presented were those adjoining the fractures. All four pieces showed an advanced stage of osteoporosis; the compact tissue and the wall of the shaft had almost entirely given place to frail spongy tissue. Scales of bones fell off at the touch, and one of the fragments had almost crumbled to pieces by the slight handling it had received since removal. The diameter of each bone was as great as usual, but the medullary canal was very large. Each canal was occupied by a dark blood clot nearly two inches long. Examination of the other bones was not allowed. A fragment of the bone that weighed twenty-nine centigrams after having been boiled and dried, was decalcified with dilute nitric acid, and then weighed eleven centigrams, which indicates that the percentage of inorganic matter in the specimen does not differ materially from the normal. The kidneys showed dilated pelves and calices, with marked atrophy of the cortical substance, and it was remarkable that with stones of that size there was no evidence of kidney disease, either irritative or obstructive in character.

TUMORS OF THE BLADDER REMOVED BY CYSTOTOMY.

Dr. J. L. Little presented a number of tumors which he had removed from the bladder of a male, aged forty-nine years, October 27, at St. Luke's Hospital; median cystotomy was performed. In introducing

the finger a number of soft tumors could be detected. These were situated at the trigone of the bladder, between, and extending beyond, the orifices of the ureters. A number could also be felt attached to the upper surface of the bladder, the situation of these growths being distinctly made out by the finger. Thompson's tumor forceps were introduced, and the tumors seized and twisted or bitten off from their attachments. It was found necessary to enlarge the opening in the bladder by a slight incision downwards towards the prostate in order to introduce the forceps with facility. Twenty distinct masses, most of them seeming to be separate tumors, were removed. These varied from the size of a hazel nut to that of a hickory nut. They all seemed to be villous in character. A large number of small pieces, evidently torn off from the larger tumors, were also removed. The surface of the bladder after the removal of these growths was left considerably roughened. Two orifices, large enough to allow of the introduction of the tip of the finger, could be felt in the situation of the openings of the ureters. These seemed to be the dilated orifices of the ureters.

The hemorrhage during the operation was considerable, but not enough to be alarming at any time. After the operation was completed the bladder was thoroughly washed out with hot bor-salicylic acid solution. This seemed to greatly lessen the hemorrhage. The wound was left open, no tube or catheter being used. During the evening following the operation the hemorrhage at times was very free. Dr. Hance, the house surgeon, tried injecting a solution of tannic acid without effect. Finally, he succeeded in controlling the hemorrhage by packing the rectum with ice, and applying ice-bags over the pubes.

After the operation, up to the date of the report, the patient had steadily improved, passing nearly all his urine by the penis, without pain, free from hemorrhage, and without recourse to a catheter.

RUPTURE OF BLADDER—INTRA-PERITONEAL—WITH FRACTURED PELVIS.
—LAPAROTOMY AND SUTURE OF BLADDER.—DEATH.

Dr. W. T. Bull presented a specimen with this history: A laborer, forty-six years of age, was brought to the Chambers street Hospital October 27, 1884, 12:27 P. M., having fallen from the first floor to the cellar through a heater shaft, a distance of sixteen feet. He was unconscious on admission; respirations, 31, shallow; pulse, 96; tempera-

ture, 95° ; surface cold. He presented evidences of the following injuries:

Lacerated wounds of right temple, fracture of left radius (Colles'), and fracture of right side of the pelvis, the exact location of which was not made out. Three hours later, while still unconscious, a catheter was passed into the bladder without difficulty, and one ounce and a half of bloody urine withdrawn. Temperature, 97.5° ; pulse, 78; respiration, 40. A 30 F. steel sound was passed readily. An hour later half an ounce of bloody urine was withdrawn by catheter, and about the same amount for three successive hours. Stimulants and hot-air bath. The man gradually gained consciousness. Had been very restless, and complained of pain in lower part of abdomen, but evinced no desire to urinate. Pulse, 120, weak; respiration, 44; temperature, 97.5° . There was dullness in both iliac regions and the hypogastrium, and half way to the umbilicus. No pronounced swelling. On introducing a black rubber catheter as far as the bladder one ounce of bloody urine was withdrawn, but two ounces with clots were expelled when the instrument was pushed to a depth of eleven inches from the eye of the catheter. With a silver catheter, the point gave to the finger the impression of engaging in a mesh of soft tissue, after it had been passed quite beyond the os internum. At midnight, twelve hours from the time of injury, pulse, 150; respiration, 44; temperature, 96° . An hour later, when seen by the reporter, the condition had but little changed: the temperature, 97° ; pulse, 140; respiration, 44. Feeling certain from a consideration of the symptoms above enumerated that a rupture of the bladder had occurred, either into the peritoneal cavity or into the subperitoneal tissue anterior to the bladder, he decided to make an exploratory incision into the abdominal wall. Ether was administered. Before making the incision it was ascertained that the pelvis was fractured only through the body and descending ramus. After opening the subperitoneal connective tissue, much blood, but no urine, was found to be extravasated in its meshes. On cutting through the peritoneum to the extent of three inches several ounces of thin bloody fluid, apparently urine, escaped, and the small intestine floated into the wound and obscured both vision and touch. The presence of the intestines rendered further exploration so uncertain that I extended the

abdominal incision to five inches, and drew out all the coils of intestine that were accessible, and held them on the left side protected by towels wet in warm water. The bladder was now drawn upwards and forwards over the symphysis, and held by a hook. A rent was now plainly seen in its posterior wall, commencing just below the point of its peritoneal covering, and extending one and three-fourths inches backwards. Its edges were slightly everted, displaying the mucous membrane, and a catheter introduced per urethra emerged through the rent. The wound in the bladder was then closed by seven carbolized silk sutures introduced from below upwards, and passed like a Lembert's intestinal suture through the peritoneal coat only. It was ascertained that the sutures were placed at intervals of one-eighth to one quarter of an inch. The bloody fluid and a few clots were then sponged out of the abdominal cavity, the intestines replaced, and the incision in the parietes closed with four silver-wire, six silk and thirteen catgut sutures. Dressing of iodoform and absorbent cotton, a small rubber drain being left at the lower angle of the wound. A soft rubber catheter was tied in the bladder. I chose this method of drainage of this viscus, in preference to a median cystotomy, because I thought it would be more efficient, while the care of a perineal wound would be likely to interfere with the quiet necessary for the proper management of the fractured pelvis. Again, the patient's condition did not permit continuing the operation longer than was necessary, and it seemed to me that the cystotomy could be done later if the catheter did not drain the bladder satisfactorily. The operation lasted one hour, and during its performance tincture of digitalis and whiskey were several times injected subcutaneously. At its close the pulse was 130, but of better volume and stronger than before; respirations, 40, and shallow. One could truthfully say that, notwithstanding the operative attack and the etherization, which was conducted with great care, the man's condition was no worse than before it was begun. In spite of all efforts to improve his condition, the man died comatose seven hours after the operation, and at his death two ounces of clear urine had passed through the catheter. Only an incomplete autopsy was possible. Dr. Murray, who kindly examined the body, reported to me that on opening the abdomen he found much extravasated blood in the

subperitoneal tissue of both iliac and the right lumbar regions, the pelvis fractured through the body and descending ramus of the right side, and the fragments of the horizontal portion separated by an interval of one inch. The peritoneal cavity contained no urine; intestines were healthy, but Douglas's *cul-de-sac* contained about one ounce of fluid blood. The urethra, rectum and bladder were removed *en masse*, and presented no lesions except some submucous ecchymoses in the bladder, and the rent, closed by suture, in the posterior wall of the bladder. Before opening the viscus, however, it was filled with water through a funnel introduced into the urethra. A little water escaped between the two lowest sutures. It was found that while the other sutures were introduced at pretty regular intervals of from one-eighth to one-quarter of an inch, these two sutures covered an extent of ground equal to one-half an inch. The wound in the mucous membrane had about the same extent as those of the peritoneal coat, one and three-fourths inches, and its edges were gaping inwardly. The bladder was completely empty and contracted. The kidneys were healthy. Other parts could not be examined.

Dr. Bull said that he had felt justified in giving the patient the chance of the operation, in spite of his other injuries, feeling sure of the diagnosis, and knowing that his greatest danger was from allowing the extravasated urine and blood to remain in the peritoneal cavity. He had been surprised at the fact that, after opening the peritoneal cavity, the intestines, though not distended, were so much in the way that he could gain no idea of the state of the bladder, save that it was empty, and he believed that by putting them aside he did no harm, and gained much in time and the facility of exploring the bladder-wound. It was not easy to introduce the deepest sutures. He had made every effort to close the wound carefully, but had failed, as the injection of the bladder on autopsy showed, to do so perfectly at its deepest part. At the same time, he thought that, as the adhesion of the peritoneal membrane took place so rapidly, occurring, as examinations after ovariectomy have shown, in from six to twelve hours, the wound would not have "leaked" had the patient lived. This seems all the more likely, as the drainage through the catheter was perfect, two ounces having flowed away in the seven hours before death, and the bladder being found quite empty and contracted.

INDEX OF SURGICAL PROGRESS.

I. NEOPLASMS OF THE MALE BREAST. By DR. B. SCHUCHARDT. This contribution consists of a compilation of the literature of the subject, without the addition of any new case. Mammary disease in the male is relatively very rare. The author concludes, with Paget, that about two per cent. of all mammary cancers occur in the male. Tubercular disease of this organ has only recently been recognized. It is rare in the female, and only two cases have been described from the male. Cases of pathological growths of this gland in the male have been repeatedly collected. Milton in 1857 counted 40 cases of cancer. Wagstaffe in 1876 added 21 more. Paulin Poirer in 1883 gave 62 cases of carcinoma, sarcoma, tubercle, etc. Schuchardt has succeeded in finding 172 cases of more or less well described neoplasms, and about 100 more mentioned but not described. Amongst the less frequent forms were—1 enchondroma, 1 chalk deposit, 2 adenoids, 3 fibroma, 1 myoma, 15 cystic and 2 tubercular tumors. The remainder were mostly of a cancerous nature. Syphiloma also occur. Of the 272, 154 were from Great Britain, 56 from France, 42 Germany and Austria, 8 North America, 4 Italy, 2 each Holland and Belgium, and 1 each from various other countries.

Of 147 patients exhibiting cancerous growths, none were under 20 years, 3 between 20 and 29 years, 8 between 30 and 39, 26 between 40 and 49, 27 between 50 and 59, 16 between 60 and 69, 9 between 70 and 79, and one was 84 years. Amongst 68 of these it is stated to have been on the right side in 32, on the left in 33. In 67 cases, the duration in 3 was $\frac{1}{4}$ of a year; in 16, less than a year; in 45, from 1 to 4 years; in 5, from 5 to 9 years; and in 1 (an American case, from the year 1840), 15 years. In 42, out of 53 cases, the axillary glands were infiltrated; in 11, not.—*Archiv für klinische Chirurgie*. 1884. Band 31. Heft 1.

The same number of this periodical contains an article, supplementary to the preceding, on *Hypertrophy of the Male Breast*, by the same author. It treats of inflammatory, as well as congenital and acquired enlargements. It contains nothing new.

II. SUBLIMATED WOOD-WOOL DRESSINGS, AND THE PRINCIPLE OF DRY DRESSINGS. By PROF. DR. P. BRUNS. This paper, read by Prof. Bruns at the Congress of the Society of German Surgeons in April, 1884, is now published in full. The author has used wood-wool in his clinic for a couple of years. The excellence of any dressing material depends largely upon its hygroscopic qualities, i. e., on its attraction for water, rather than the quantity which it may ultimately take up. In this regard, wood-wool is a very superior article. The prepared (sublimated) wool costs in Germany only some 16 cts. per kilo. One of their

makers has just introduced a convenient improvement in the shape of sheets made up of about 20 per cent. cotton, the rest wood-wool; this can be cut to fit, and renders the preparation of sacks, pillows, etc., unnecessary. The principle of dry dressings is to dry up the wound secretion. (It might very properly be called an exsiccation dressing.) Concentrated fluids are poorly adapted for the growth of low organisms, which principle is availed of in preserving meat by simply drying it.

Two things are necessary for the success of the dry dressing: 1, an abundance of very absorptive material; 2, the absence of any impermeable layer in the bandage.

He questions the reliability of a simply aseptic dressing, and believes that for the present the volatile carbolic acid should be substituted by some fixed antiseptic, as sublimate.

Of 557 operations in the Tübingen clinic, treated with sublimated wood-wool dressings, only 10 (or 1.7 per cent.) were fatal, and these not from the wound treatment, but from other diseases. He considers that mercuric bichloride protects better against erysipelas than carbolic acid or iodoform. Thirty-seven amputations yielded 32 primary unions, etc. In war surgery the dry dressing will, he predicts, prove valuable.—*Ibid.*

III. ECHINOCOCCUS OPERATIONS. By DR. A. VON PUKY. The author cites the principal methods: puncture, aspiration, injection of iodine, drainage, electrolysis, caustic pastes, etc. Then follows a short account of the operative procedures most practiced of late.

His case was that of a female, aged 33 years. There were two cysts—one of the liver and the other of the abdomen. The latter was opened at one operation; the former a week later, also at one sitting, as recommended by Landau. Cure, after gradual expulsion of the sack, etc. At the end he gives German and Hungarian literature of these operations.—*Ibid.*

IV. CACHEXIA STRUMIPRIVA. By DR. BAUMGAERTNER. Etiologically, at least, this disease is a recent addition to knowledge. It is a truly artificial disease, and moreover never occurs in a healthy person. It appears to have been first described by Kocher at the German Congress last year (1883). As the name indicates, it is a debility developing after the removal of goitre—for which latter the term struma is largely used in German medical writings. Both K. and B. agree in believing it to result from interference in the respiration. B. had operated nineteen times for bronchocoele, with three deaths, all three after total extirpation. Of the other sixteen, eleven were totals, four of which subsequently presented consequences more or less resembling K.'s cachexia strumipriva. In these four, the vocal chords suffered a peculiar paralysis, or only paresis, first of the adductors and then of the abductors. (In the fourth case only the abductor paresis was observed.) In one case B. had to perform tracheotomy; in the others, electricity, tonics, etc., sufficed. As soon as freer respiration was secured improvement began.

The recurrens nerve could hardly have been wounded. K.'s explanation was

that too many tracheal vessels had been tied, and, as a result, he found an atrophy tracheæ. B. thinks this may have been true in K.'s patients, but could hardly have been in his. He avoids the trunk of the thyroid arteries, and ties only the arterial branches just as they enter the sac. He hazards no explanation beyond hinting that the immediate cause must be in the recurrent. He is sure that by ligating and severing only close to the tumor this form of cachexia can be largely avoided.—*Ibid.*

V. ON THE USE OF BURIED SUTURES, PARTICULARLY IN PLASTIC OPERATIONS. By PROF. DR. E. KÜSTER. The use of these originated with the gynecologists (Werth, 1879). Küster approves very highly of buried sutures in perineorrhaphé. After it is all sewed up, his custom is to sever the sphincters in the posterior median line. Valuable again in colporrhaphé and in Schröder's laparomyotomy. The method has recently been taken up by general surgeons. Neuber's success with it is noticed in this journal. Küster had observed the subsequent development of abdominal hernia in nearly half his cases where Spencer Well's deep sutures were applied, while the new method, with courses of sutures, has yielded resistant cicatrices.

In some cases of radical operation for hernia, particularly in congenital inguinal forms, sutures in courses have been used. Küster extends them to all forms. He has also found them valuable in ectropium of the lids, some urinary fistulæ, etc. The present development of surgery aims at healing a wound at one operation, so that the reparative forces of the body will suffice to complete the cure, and that in shortest and pleasantest manner. To this end he pleads, with Neuber, for the use of buried sutures and the abolition of drains. Nevertheless he warns against the too universal application of Neuber's method without drainage.

In laparotomies, herniotomies, extirpation of a dermoid cyst between anus and coccyx, etc., he has succeeded with buried sutures and iodoform-collodion over the wound. "This latter forms the total, simplest possible dressing." When used with discretion this gives excellent results. He acknowledges the occasional occurrence of suppuration. For buried sutures he ordinarily uses catgut, but where the tension is considerable he puts a few silk ones along with the others.—*Ibid.*

VI. DEFECT OF CALVARIUM RESULTING FROM AN INJURY IN THE FIRST YEAR OF LIFE. By DR. A. V. WINIWARTER. This was observed in a boy of thirteen years. Nothing noticeable on extremities. Asymmetry of face. Marked deformity of cranium. The deficit is in the right parietal bone, and appears to extend back nearly to the lambda suture. No scar. Bone and even connecting membrane wanting. Pulsation can be seen and felt. His trouble originated in a fall on the head when six months old. Later a tumor developed in the right parietal region and did not disappear until his ninth year, since which it still swells occasionally. If he lies on his back a few minutes, a fluctuating swelling appears at the lower end of the defect, which, with other symptoms, leads W. to conclude that there must originally have been an extravasation of cerebro-spinal fluid, rather

than of blood. He compared the resulting defect to a pseudarthrosis. A full description of the present condition of the boy is given, accompanied with plates. This is followed by a discussion of similar observations of others. W. reported his case at the German Congress of Surgeons, April 19th, 1884. On the 30th of April, Conner, of Cincinnati, communicated a paper upon the same subject to the American Surgical Association (Traumatic Cephalhydrocele, *Am. Jour. Med. Sci.*, July, 1884). He gives all the cases mentioned by Winiwarter, except W.'s new one, and perhaps the autopsy by Rokitansky, besides others. He tabulates twenty-two; add W.'s one, and we have a total of twenty-three.—*Ibid.*

VII. PARTIAL RESECTION OF THE WALL OF THE BLADDER. By DR. N. ZNAMENSKY. The author describes experiments on dogs. In rupture of the bladder, he concludes, with previous writers (s. Stein, Rupt. of Bladder, *Annals Anat. and Surg.*, 1882), that early operating has far greater chance of success; and with Macksimow that the suture should not include the mucosa. After resection of $\frac{1}{3}$ and even $\frac{2}{3}$ of the bladder, enough power remained in the detrusor urinæ to expel the urine. When more was removed in the dog it was necessary to keep the bladder from filling to prevent stagnation of the fluid in the various passages.—*Ibid.*

VIII. LARYNX-EXTIRPATION FOR CANCER. By DR. E. HAHN. Report of five cases operated by H., three total and two half extirpations. He pleads for the partial removal, where admissible. Twenty-four of the fifty-two total extirpations so far reported died immediately or very soon after the operation; fourteen had relapses. Eleven half removals show one immediate death and three relapses. He presented a man of seventy-one years, from whom four years previously he had removed half of the larynx for carcinoma. This, he says, is the longest period free from relapse yet reported.—*Ibid.*

IX. TORSION OF THE SPERMATIC CORD, A PECULIAR COMPLICATION OF CRYPTORCHISM. By PROF. DR. C. NICOLADONI. N. cites several observations and facts as evidence that in cryptorchism the retained testicle is, owing, he thinks, to absence of the mesorchium, much freer, looser than when in its usual position. He gives a case where the operation of instating the retained testicle in the scrotum was greatly facilitated by the cord being quite free even after drawing it down. This freedom would allow the testicle to turn on its suspending axis: interference with its circulation would result—in a word, gangrene. He believes many of the cases classed as periorchitis and testicle-necrosis are really thus caused. In a young man with inguinal testicle periorchitis was diagnosed. Extirpation. Some sero-sanguinolent fluid in the processus vaginalis. Testicle blue-black and tensely distended, but not incarcerated. Pedicle of two cords, which showed that the pedicle was twisted 180° . The cord lay entirely free, without peritoneal connection. Vessels and tissues of testicle charged with blood, and veins thrombosed. No semen. The two divisions of the cord consisted, one of nerves and vessels, the other of the vas deferens. A second case was very similar, except that the testicle was in the scrotum. He sums up his conclusions: An inguinal

testicle or such a one which has made a delayed descent (into the scrotum) is liable to torsion of its cord. When less severe, this may correct itself, or appear to be periorchitis or incarceration; when severer, it leads to necrosis of testicle.—*Ibid.*

X. LUXATION OF CERVICAL VERTEBRÆ. By DR. W. WAGNER. W. described seven new cases. He has also collected fourteen others, published since Blasius, in 1869, counted one hundred and seventy-two.

1. Autopsy showed bilateral luxation of sixth cervical forwards, with rupture of the intervertebral disc between 6 and 7. Died within twenty-four hours.
2. Same place; bilateral backwards. Lived four weeks. Autopsy.
3. Same diagnosed, living four years subsequently.
4. Death twenty-four hours after injury. Unilateral luxation between 4 and 5
- c. The left processus obliqui of each fractured.
5. Left-sided rotation luxation of 3 c. vertebra. Perfect recovery.
6. Left-sided rotation luxation of 5 c. vertebra. Imperfect recovery.
7. Left-sided rotation luxation of 5 c. vertebra. (In treatment.)

He also gives a case of transverse fracture of the body of the axis, and other notes, with discussion.—*Ibid.*

Articles II., IV., V., VI., VIII. and X. were all read at the German Congress for Surgery last April.

XI. VAGINAL HYSTERECTOMY; CONSEQUENT FISTULA OF URETER; NEPHRECTOMY. By DR J. BOECKEL. In the *Gaz. Med. de Strasbourg*, September, 1884, Dr. Jules Boeckel reports the case of a patient, æt. 41, of good general physique, but affected with carcinoma of the os externum and neck of the uterus, from whom he removed the uterus through the vagina. Listerian precautions were adopted, including the spray. The uterus having been drawn down until it protruded an inch from the vaginal orifice, the posterior cul-de-sac was easily cut through, then the anterior, and, guided by a sound inserted in the bladder, the separation from that organ was readily accomplished with the scalpel handle. Then by traction exerted on the fundus, with two fingers, the uterus—free except at the broad ligaments—was drawn down until the right broad ligament protruded at the vagina, and which was then cut between a carbolized ligature and hæmostatic forceps. The left broad ligament, which could not be drawn down, was ligated with more difficulty, and cut between ligatures, allowing the organ to fall into a receptacle prepared for it. Just above the wound was found, on the left side, a mass of enlarged glands, which was removed, causing considerable hæmorrhage, which was suppressed by the application of hæmostatic forceps. No sutures were applied to the peritoneal wound, there being no tendency to hernia, and the vagina was plugged with a tampon of iodoform gauze. Two days later, there having been not the slightest unpleasant symptoms, the *pincès hæmostatiques* were removed. From this time there was a continuous dribbling of urine from the wound, which was the source of constant irritation to the patient, and one month later—it having been discovered that the left ureter had ulcerated through at a point where it had been com-

pressed by the hæmostatic forceps, and from it was drained the urinary flow—nephrectomy was resorted to as the only means of remedying this accident. By lumbar section this was easily accomplished, and under iodoform dressing she rapidly recovered, being discharged, cured, one month later. The patient finally died, however, five months after the latter operation, a victim to recurrence of carcinomatous disease affecting the lumbar, iliac and mesenteric glands. In connection with this operation, Boeckel remarks that only in cases where the neighboring tissues are absolutely free from the cancerous disease should there be operative interference, and cites this case as an evidence that even in these cases it may be unavailing, and recommends great precautions in undertaking such operations.—*Gazette Medicale de Strasbourg*.

XII. CHOLECYSTOTOMY; WITH A REPORT OF TWO NEW CASES, A TABLE OF ALL THE HITHERTO REPORTED CASES AND REMARKS. By J. H. MUSSER, M. D., AND W. W. KEEN, M. D.

Case I.—History of biliary calculi of five years' duration; jaundice for eight months; symptoms of obstruction; attempted cholecystotomy by Dr. Keen; recovery.

Case II. Acute gastro-intestinal catarrh, followed by jaundice, both becoming chronic; symptoms of internal suppuration; enlarged gall bladder; cholecystotomy by Dr. Keen; temporary relief; death; autopsy.

The table includes thirty-five cases, in four of which the abdominal cavity, but not the gall bladder, was opened. The latter, therefore, are not, strictly speaking, examples of cholecystotomy. Keen, in his surgical remarks, recommends aspiration and acupuncture for the purposes of diagnosis, although not free from danger. If the diagnosis be fairly well established, or the symptoms threatening, he strongly advocates an exploratory incision, with strict antiseptic precautions, and after thorough examination cholecystotomy may be performed, or the wound closed, according to indications. The incision is to be made over the centre of the tumor, and parallel to the free border of the ribs, and three inches in length. The gall bladder is now aspirated, a flattened scoop devised by Keen being used to keep back the intestines, and carry off fluids, being furnished with a rubber tube at one end to serve as a conduit. The bladder should now be incised to the extent of an inch, all discoverable calculi removed with forceps, and a fistula established by sticking the edges of the incision in the bladder to that in the abdominal wall. Owing to long continued jaundice disorganizing the blood, there is a marked hemorrhagic tendency in all these cases. The table shows remarkably successful results, only ten deaths occurring in thirty-five cases.—*The American Journal of the Medical Sciences*. October, 1884. No. CLXXVI.

XIII. COLOTOMY, WITH A COLLECTION OF 351 CASES. By WILMER RIDGWAY BATT, M. D. From the author's analysis of his assiduously collected statistics, it appears that the per cent. of recoveries is greatest where the operation is performed for fistula; least, in cases of imperforate anus. Recoveries occurred more fre-

quently after Amussat's operation than after Littre's. In compiling his list of cases the author has omitted a quite recent successful case of lumbar colotomy, in an infant of two months, by Geo. R. Fowler, of Brooklyn, which can be found reported in the *Medical Record* of May 19, 1883.—*Ibid.*

XIV. REPORT OF A CASE OF BILATERAL DISLOCATION OF THE SIXTH CERVICAL VERTEBRA FROM THE SEVENTH, WITHOUT FRACTURE OF THE BODY OF THE VERTEBRA. BY J. WIEST, M. D. Successful reduction after thirty-eight hours. Death at thirty-fifth day.—*Ibid.*

XV. A CASE OF RESECTION OF THE PYLORUS FOR CARCINOMA. BY RANDOLPH WINSLOW, M. A., M. D. Operation lasted three hours. Death two hours after. No autopsy obtained.—*Ibid.*

XVI. ON CALCULUS IMPACTED IN THE URETER, AND THE FEASIBILITY OF REMOVING IT BY SURGICAL OPERATION. BY HENRY MORRIS, A. M., F. R. C. S. The author finds that when impaction occurs, the site, in the majority of cases, is either in the upper part of the ureter, within an inch of the pelvis, or in the lower end, within three-fourths of an inch of the vesical orifice. In the former case an exploratory lumbar incision will enable the calculus to be detected and extracted. An instance of the latter condition came under the author's notice, and was confirmed by digital examination of the bladder in an adult female. With a scoop or curette the extraction of the calculus would have been feasible, but in the absence of proper instruments it was not done, and the patient's condition negated any subsequent attempt, death occurring in three days. Other cases are mentioned, in which this condition was discerned at the autopsy. In one case the calculus was felt through the rectum. Diagnostic points are vague and uncertain. Suspicion of calculus impacted in the vesical extremity of the ureter should be aroused, if pain in the loins, bloody urine, and similar symptoms have persisted for months or years, if recurring attacks of renal colic, with the pain extending lower and lower along the course of the ureter, have occurred, and if the bladder finally becomes painful and irritable. A swelling or an increased resistance in the flank, marked decrease in the quantity of urine, or anuria, or, after lithotomy, fresh symptoms quickly arising, should strengthen the suspicion. An impacted calculus has doubtless been mistaken for an encysted stone.

The operation recommended is as follows: Having dilated the urethra, in the female, or performed external urethrotomy in the male, the index finger of the left hand should be passed into the bladder. If a hard fixed body should be felt in the situation of the opening of either ureter, a knife shaped like a gum-lancet should be passed in, and the tissue covering the stone should be incised, a scoop being used to turn the calculus out of its bed, and to remove it.—*Ibid.*

XVII. MODERN ANTISEPTIC SURGERY, WITH CASES. BY F. C. FULLER, M. D. This article describes methods familiar to those engaged in the practice of antiseptic surgery.—*Ibid.*

XVIII. A CASE OF IMPERFORATE RECTUM IN WHICH LUMBAR COLOTOMY WAS PERFORMED. By JOHN H. PACKARD, M. D. Death resulted in 137 days from date of operation. In a similar case, Packard would perform inguinal colotomy, as affording better opportunities of establishing the natural passage, the greater difficulty and risk being counterbalanced by the readier access to the terminal part of the gut.—*Ibid.*

XIX. TWO CASES OF NEURECTOMY FOR THE RELIEF OF FACIAL NEURALGIA. By GEO. R. FOWLER, M. D.

CASE 1. Neuralgia of frontal division of ophthalmic or first portion of the fifth nerve. Several years' standing. Incision along upper margin of left orbit—Lienhart's operation. Supra-orbital nerve traced back to point where it and supra-trochlear arise from frontal nerve, beyond which point it was severed, and its branches dissected out from the upper lip of incision. Supra-trochlear divided near pulley of superior oblique muscle. Wound healed in a week. Neuralgia disappeared at once, and there has been no return after six months.

CASE 2. Tic douloureux, three months' standing. Modified Carnochan's operation. Curvilinear incision parallel and little below inferior orbital margin. Upper flap raised; branches of infra-orbital dissected out. Anterior surface of superior maxillary bone laid bare, and trephine, five-eighths of an inch in diameter, applied, and a button of bone removed from the wall of the antrum. Head-mirror now used for light. A half-inch trephine punctured posterior wall of antrum. With small chisel, the infra-orbital canal was broken down. Finally, section of the superior maxillary nerve was made, beyond point where it joins Meckel's ganglion. Wound healed slowly—one month. No recurrence of pain after five months.—*The Medical Record. 1884. Vol. 26. (No. 14, October 4).*

XX. LAPAROMYOTOMY. REPORT OF TWO CASES SUCCESSFULLY TREATED IN A GENERAL HOSPITAL. By LEWIS A. STIMSON, M. D. Two cases of multiple fibromata. Removal of uterus and ovaries in both instances. Pedicle secured by transfixion and ligation with india-rubber cord. Treated by extra-peritoneal method. Ligatures came away on tenth and seventeenth days respectively. Antiseptic methods. Highest temperature in one case, $100\frac{1}{2}^{\circ}$; in the other, for a few hours, 101° . Final cicatrization slow. In the first case, the stump of uterus promptly sank back into original position; in second, remained for several weeks drawn high up and adherent to anterior abdominal wall. Apprehensions that the cervix would remain so attached to the abdominal wall as to interfere with dilatation of the bladder were not realized.—*Ibid.*

XXI. DANGER FROM PLASTER OF PARIS JACKETS, WITH A DESCRIPTION OF THE WOVEN-WIRE JACKET. By SAMUEL W. SMITH, M. D. Several cases of bronchial trouble, due, as the author claims, to cooling of the body during the drying of the plaster jacket, suggested the use of a woven-wire corset.—*Ibid. (No. 16. October 18).*

REVIEWS OF BOOKS.

LECTURES ON THE PRINCIPLES OF SURGERY. Delivered at Bellevue Hospital Medical College. By W. H. VAN BUREN, M. D., LL. D. (Yalen.), formerly Professor of the Principles and Practice of Surgery in the Bellevue Hospital Medical College; one of the consulting surgeons to the New York Hospital; of the Bellevue Hospital, etc., etc., etc. Edited by LEWIS A. STIMSON, M. D., Professor of Physiology and Clinical Surgery in the Medical Department of the University of the city of New York. New York, D. Appleton & Co., 1884. 1 vol. 8vo., pp. 588.

We sat down to the perusal of this work with lively anticipations of the pleasure and profit likely to accrue from its study, and we now close it, confessing that we have been in no way disappointed. This work, in common with all the rest of this author's scientific writings, is remarkable for a terse and at the same time eminently lucid, suggestive style. There is no necessity to read and re-read a statement to ascertain the author's exact meaning, for "he who runs may read," quite as understandingly as he who comes to a full stop.

We are told by his editor that Dr. Van Buren habitually prepared a syllabus of his lectures, and often wrote out a lecture in full before its delivery. "During the latter years of his life he wrote and rewrote many of these lectures, arranged them and added to them in such a way as to make them a systematic exposition of the subject." The editor has shown his good taste by publishing these manuscript lectures as they were left by the author, without either addition, or "other changes than a few verbal ones." To him we therefore return thanks for presenting us with a faithful transcript of the views of one of America's most learned and able teachers, matured by nearly thirty-five years of continuous surgical teaching and practice.

The work is of course not a complete treatise on the principles of surgery, but was simply intended as a presentation of those salient portions which are specially adapted to the student and practitioner, desirous of refreshing his knowledge by attendance upon didactic lectures. In this review we shall be able only to lightly touch upon here and there that which has specially struck us as worthy of censure or praise.

The first twenty-five pages are devoted to the consideration of a number of subjects, among which specialism receives extended attention. The author shows that although in one sense surgery *is* a

specialty, yet even in the earliest times surgery and medicine were never disconnected, "but wherever the highest scientific culture has prevailed, medicine and surgery have been regarded as identical." He contends that the modern specialist too often fails to recognize that he only should be one, who possesses "a certain fitness and opportunity," with "a certain degree of familiarity with all branches of medicine," in addition to the mere fancy begot of vanity or desire for gain. Dr. Van Buren recognizes most clearly the impossibility of attaining an equal degree of skill in all branches of medicine, but wisely thinks that "the student who entertains the ultimate purpose of becoming a specialist must grasp the whole curriculum fairly and honestly, or he will become inevitably a fractional member of the profession, and can never practice a specialty on a legitimate basis."

He emphasizes the importance of a surgeon being a good physician before he becomes a surgeon, by saying that the modern surgeon must possess *all* the *qualifications* of the physician, and, besides those, certain other qualities in addition. We have thus dwelt upon this subject, because we so often hear students or young graduates say that they intend to practice only certain specialties, and after a short sojourn abroad, or as students of some noted specialist, they at once become, not only in their own estimation, but in that of too many of the profession, *authorities*, without any broad basis of observation and experience in general practice to guard them against errors which a more comprehensive education would have enabled them to avoid.

The author pronounces himself as distinctly on the side of those who consider that vivisection has been of incalculable advantage to surgery, going so far as to say that "the time is not far distant when the surgical student will be compelled to follow courses of experimental research in a surgical laboratory."

The second chapter is devoted to the consideration of the classification of wounds and to the treatment of incised wounds, wherein the writer apparently commits himself to the germ theory. The succeeding chapter treats of, in a full and satisfactory manner, the subject of hæmorrhage, containing, among many others, two practical points, which, although well known to experienced surgeons, seem to be overlooked by those less fortunately circumstanced, viz.:

1. The furious hæmorrhage from a small arterial trunk wounded close to the main vessels.

2. That "the removal of glandular tumors from the front of the neck should never be lightly undertaken," and that when such an operation is attempted, it is unwise to draw out a tumor and cut across its deepest attachments in this situation, as they almost certainly contain its principal artery; but rather, carefully, first cast a ligature around the final attachments before dividing them.

He also calls attention to the fact that a much larger amount of blood can be lost without producing death *per se* than is usually thought, Dr. Van Buren estimating that one-half the blood in the body—say eight pounds in a man weighing one hundred and ninety-two pounds—must be lost within a little time. This remark does not apply to childhood, or old persons, who bear the loss of blood badly. Indeed, the author mentions a death from convulsions which resulted from the loss of blood during an operation for hare-lip.

With reference to styptics—against which some writers are now urging war—the author holds “in a general way” * * * “that the milder styptics are the remedies for capillary oozing, and simple pressure for venous flow, while the ligature is reserved for arterial hæmorrhage.” These agents, according to the author’s classification, are not only subsulphate of iron and other astringents, but cold, the actual cautery and the simple absorbents, such as cobwebs, spunk, etc.

We are surprised that Dr. Van Buren does not mention the use of hot water as the best means of arresting the capillary oozing following the use of the Esmarch bandage. This agent is certainly preferable, in our experience, to the use of cold water, as recommended by the author. The exceeding value of the skillful use of the compress and bandage, even in serious arterial hæmorrhage, is illustrated by a case of Valentine Mott’s, where that surgeon believed that he had “successfully cured a wound of the subclavian” by such a dressing. Baron Larrey certainly did succeed, by the employment of like measures, in the case of a wounded external carotid, a case which has been misquoted by Lidell in the *Encyclopædia of Surgery* as a successful ligation of that vessel.

A most careful study of the ligature follows, wherein the author commends cautiously, but decidedly, the animal ligature, the lecture having been evidently written some years back, before the latest developments in the preparation of these hæmostatic agents.

Dr. Van Buren says that he has been successful in permanently restraining hæmorrhage from atheromatous arteries—such as the posterior tibial—in amputations—by plugging them with a little “conical plug of soft wood, with a ligature attached to its base.” “A ligature, if left too long upon an artery, is liable to become rotten and to break in the wound when finally jerked away,” the author states. Why jerk it away at all? Surely such a proceeding is a dangerous one. Van Buren is not fond of torsion, giving it a very secondary place.

The author quotes some good advice from Brodie, which we wish all young surgeons, and above all, *assistants*, would take to heart, viz.: “The surgeon need have no fear of being unable to command the hæmorrhage in an operation unless there are more arteries turning out

blood at one time than he has fingers on both hands to stop them with."

The subject of sutures and the process of repair after wounds is handled in a masterly manner. The only criticism we have space to make is that we do not believe the "molecular granules found in lymph" have resident in them "the formative power," and that they "cluster themselves together to form nuclei, and around the nuclei cells form," unless these granules are really nuclei which have been observed under such a *low power of the microscope* as to prevent recognition of their true nature.

In the seventh chapter, when speaking of pus, the author uses the following words: "Living microscopic bodies have just this significance, and, apparently, no other, namely, that the pus in which they are found is about entering into decomposition, that its vital quality is at a low ebb, and that chemical forces are in the ascendent." Abscess receives an extended consideration which, with the collateral subjects incidentally mentioned by the author, is worthy of careful study.

The author's belief that pus is at the best "useless," leads him naturally to the conclusion of Robin, that "Pus is formed in the interior of our tissues when the necessity arises for the expulsion of some foreign substance, whether introduced into the organism from without, or resulting from the death of a portion of solid tissue from within," and in these concise and lucid statements the whole subject of the *raison d'être* of pus formation seems to us included.

Dr. Van Buren takes the novel position that so-called "sympathetic" abscesses, i. e., those forming near diseased joints, an inflamed urethra, or any other "established focus of inflammation, but not near enough to form any part of the existing textural excitement," are due "certainly in some cases to defect in the quantity or perversion of the quality of the nerve force which should be supplied to the tissues."

Did space permit a much less recondite cause could, we think, be demonstrated. Among other facts in support of the nerve theory he asserts that acne is due to a "peculiar disturbance of innervation which arises, in both sexes, from want of normal exercise of the genital function," * * * which, says he, "is proved by the disappearance of this"—acne—"after marriage."

Dr. Van Buren is mistaken in stating that Paget has described "residual abscess" as "a collection of pus that results" * * * "from the breaking down of connective tissue neoplasm" * * * "organized in some former effort at repair." Referring to Paget's lecture on that subject, he says "most of them are formed where pus, produced long previously, has been wholly or in part retained and become dry, or in some form 'obsolete.' But some of them, it is probable, are formed

in the thickenings, adhesions, or other lowly organized products of inflammations long past." Thus it will be seen Dr. Van Buren has somewhat misconceived Paget's meaning.

A most pregnant chapter on sinus and fistula follows that upon abscess, both of which are replete with good sense and practical points. Chapter eleven, treating of punctured and penetrating wounds, although good, contains nothing specially striking except the classification of such wounds as *smooth* and *rough* punctures. This is a practical point too little considered by practitioners, a punctured wound being regarded as very dangerous simply because it is *punctured*, while we know that the exploring and other trocars make punctured wounds with impunity. Such wounds are oftentimes dangerous simply because they are "rough" punctures, which cause death of small fragments of the tissues, resulting in deep-seated suppuration. Of course, the non-coincidence of the openings in the various layers of tissues penetrated, when the part is placed in a different position from that in which the wound was received, has something to do with the disastrous results of a punctured wound; but the chief trouble arises, as Van Buren points out, from the destruction of shreds of tissues affected by a "rough puncture."

The author calls attention to a curious fact, in the chapter upon tetanus, namely, that this disease may prevail in one locality, while it may be unknown in one entirely similar, perhaps only three miles distant. Want of space alone prevents us from quoting *in extenso* the interesting account of the differential diagnosis of this disorder.

Speaking of contused wounds, Dr. Van Buren says that the stunning that follows a severe blow is an effect of contusion of the cerebral tissue. Although this is certainly not the whole truth with regard to the etiology of cerebral concussions, we are glad that the author does not persist in teaching the theoretical, undemonstrable "molecular disturbance" theory, of which we have absolutely no proof, indeed quite the contrary.

As an instance of the happy methods by which Dr. Van Buren both explains and fixes facts, the following explanation of the incontinence of feces and the retention of urine common in shock is given. The peristalsis of the bowels effected by unstriped muscle, being under the control of the sympathetic system, is little influenced by the will, while the sphincter ani is voluntary, and, like all the muscles of animal life, being dominated by the will, is liable to be relaxed, since the higher centres are most affected in shock. "Moreover, it requires more exertion of muscular force and concentration of mental effort to prevent the contents of a full rectum from escaping than it does to extrude them. Hence under the full influence of shock there will be

involuntary escape of *fæces* whenever the rectum is distended. In the case of the bladder, on the contrary, *more effort* is required to extrude its contents than to retain them; hence there is retention of urine from sheer inability to make the effort to void it, as in typhus fever." (The italics are our own.)

Dr. Van Buren, while giving an otherwise unexceptional account of shock, still seems to be an unquestioning disciple of Erichsen, as far as "railroad spine" goes. This we believe is an error.

After most careful search in Baron Larrey's own works, we cannot find a trace of anything to lead us to believe that Larrey resorted to the skins of animals recently killed in the case of Marshal Lannes, who was wounded at the battle variously called Elchingen, Erlingen or Essling, NOT at Austerlitz as Dr. Van Buren states. In the treatment of shock, the excellent aphorism of Bryant is endorsed: "To do enough to maintain life is essential; to do more is dangerous."

He contends that "reaction merging into fever means that it is incomplete and halting;" from which he deduces the practical lesson that, as it is *not* inflammatory, surgeons must beware of falling into the popular error that such a condition requires remedies of a lowering character.

A most exhaustive consideration of the subject of poisoned wounds is chiefly of interest because the author teaches that "the general outline of symptoms and, in fatal cases, the mode of death" * * * "in dissection-wounds and serpent-poisoning, are suggestive of *strong* similarity, if not identity, in nature of the noxious agent in the two affections." As well as we can gather, both because the sentences quoted head the chapter on septicæmia, and from other arguments in the text, the author thinks that serpent-venom and the poison of septicæmia and pyæmia are very similar, if not identical in nature, and certainly so in effects. Dr. Van Buren describes but two forms of blood-poisoning, viz., septicæmia and pyæmia, teaching, most justly, that there is in most cases a mixture of both diseases. He entirely ignores the fact that there is another wound disease, a toxæmia, where the poison does not multiply in the blood, where the symptoms are grave in proportion to the amount of the poison absorbed, that it is rapidly eliminated, and that dose after dose—if no individual one be in fatal quantity—may be taken up and eliminated with final recovery. Nothing like this can be said of a true septic poison, which, however minute its original quantity, multiplies a thousand-fold in the blood.

Dr. Van Buren thinks that mild septicæmia is a more common affection after wounds and injuries than is most commonly supposed, in which opinion we concur; but he goes so far as to consider this dis-

ease present when a patient ceases to do well after injury or operation without obvious cause, the granulations becoming unhealthy, with a too frequent pulse, anorexia and a dryish tongue, provided there is no hectic periodicity about the symptoms. Listerism is all through spoken of in favorable terms and as an imperative duty to our patients.

Suppuration in the joints in pyæmia is thought to result from "interference with the nutrition of the articular cartilages, probably through embolic obstruction of the blood-vessels through which they derive their nutritive supply." This view is, so far as we know, original with the author, purely theoretical, and in the highest degree improbable.

Recovery, even in acute pyæmia, is shown to be possible by "two or three" such cases having occurred in the author's practice. Many pages are given to the consideration of erysipelas, but nothing is said which calls for any special comment, except in connection with brain symptoms in that disease. They are not due, the author teaches, to extension of disease from without, and call neither for antiphlogistic measures nor the suspension of iron and stimulants. If meningitis be present with erysipelas, its diagnosis is most obscure, and its prognosis almost hopeless, since it is really due to blood-poison. The author deals at length with hydrophobia, paying especial attention to the disease in the dog, as he considers the disease *always* fatal, and that therefore prevention—by recognition of the disease in the dog—is the only rational object in view. Gangrene receives full consideration.

Inflammation most properly receives extended notice, and the author's views, well up to the time, are admirably epitomized in the following quotations: "Inflammation, then, as far as we certainly know, consists in a series of changes which take place mainly, if not entirely, in the capillary vessels of a part and the connective tissues surrounding them, and which, if not interrupted, result in cell proliferation and the formation of embryonic and, ultimately, of connective tissue." * * * "Inflammation" * * * "is nothing more than a series of changes that follow injury, and cannot, therefore, originate of itself." The "injury" to the tissues may arise from death of a portion, from perverted nervous influence, from a poison in the blood, etc. As this process is not a disease, but a series of changes tending to conservatism or the rejection of foreign and hurtful matter, "the destructive results which may follow are not referable to the inflammation, but they are the outcome of other influences, *which it is the province of our knowledge to avert.*"

Fractures receive their due share of attention, and the author's teaching thereon contains much of practical interest. We were much surprised to read in the work of one so learned as Dr. Van Buren that

"Pott's fracture" received the name because that surgeon "was himself a victim of the accident." This is a grave error, together with the remainder of the account. Pott did indeed break his leg, and behave as described in the text, but the injury was a *compound fracture of the leg*, as will be seen by a reference to his life by Sir Jas. Earle, in Pott's *Chirurgical Works*. Pott described the fracture now called after him, but did not otherwise suffer from it!

Dr. Van Buren gives the good rule in treating fractures, "never apply a bandage unless to meet some clear indication for its use;" * * * also, "never apply a bandage to a limb beneath the splints." "A bandage is not to be employed to force an unruly or projecting fragment into place; this is to be accomplished by special means. The bandage * * * is a purely retentive agent."

In the event of being unable to reduce a fracture by manipulation under ether, the author gives the following somewhat heroic advice: "In view of the safety of such a measure, under antiseptic treatment, and the very considerable danger of union with deformity, or absolute failure of union, it would be proper even to cut down upon the fragments in such an emergency in simple fracture and remove the obstacle to apposition."

Much attention is paid to the subject of tumors, Lücke's classification being adopted, and, upon the whole, the subject is well treated. An exceedingly ingenious explanation of the post-natal disappearance of naevi, drawn from a knowledge of their histological structure, is to the effect that "the connective tissue which with budding capillaries" forms these tumors, is stimulated unto more active growth by the rougher contact and bruising it receives; the new connective tissue thus formed contracts and thus obliterates the vessels.

The teaching is clearly that malignant growths are of local and not constitutional origin, and the conclusion from this is, early and free removal of suspicious growths.

Concluding our remarks we can only say that what we have commented upon, as of interest, is as nothing to that which, for want of space, we have passed by. Although the book contains some errors, as well as teachings with which we, in common with many other surgeons, cannot adhere to, yet this book should be owned and read by all surgical practitioners. As far as the subjects treated of are concerned, it more nearly approaches our ideal of what a work on the principles of surgery should be, than any with which we are acquainted.

The book is well printed, and singularly free from typographical errors, showing that the editor has really edited the book, and not merely placed his name upon the title page.

C. B. NANCREDE.

VORSCHLAEGE ZUR BESEITIGUNG DER DRAINAGE FUER ALLE FRISCHEN WUNDEN. VON DR. G. NEUBER, Docent für Chirurgie, an der Universität Kiel. (Methods for dispensing with drainage in the treatment of all fresh wounds. By Dr. G. Neuber, Instructor in Surgery, University of Kiel.) II. Mittheilungen aus der chirurgischen Klinik zu Kiel. Herausgegeben von Dr. Friedrich Esmarch, Professor und Direktor der Chirurgischen Klinik, Kiel. Lipsius & Fischer, 1884. 1 vol. 8vo., pp. 44.

The object of Dr. Neuber's brochure is to describe some further improvements introduced at Kiel, in the management of fresh wounds, with a permanent dressing. It is in continuation of a little work on the same subject, published by Neuber last year.

The introduction of the fragrant forest-wool cushions has, he says, gone far towards preventing the occasional appearance of bad odor about the permanent dressing. His efforts in the main, however, have been directed to devising such methods as shall do away with drainage tubes, canalization, etc.

His criticism of drainage tubes is, first, that they act as foreign bodies, more or less irritating and provocative of secretion; second, that they keep the wound surfaces apart, prevent to that extent primary union and delay cure; third, that such a tube is a communication between the interior of the injured tissues and the outside, and thus opens the way to certain dangers which, however, the antiseptic bandage guards against. Smaller evils of drainage are its complicating and prolonging the operation and, if absorbable drains are used, the additional cost. The use of these latter (decalcified bone tubes) has remedied the other evils only in part. To render the abolition of drainage possible, three things are very necessary, scrupulous antiseptis, utmost diminution of wound secretion, and avoidance of cavities within the wound.

I. He details first his preparations for the operation, and upon these he lays great stress; then follows the operative technique. He recommends that operations be conducted so far as possible, in three separate rooms, respectively for non-suppurating, chronic suppurating, and acute suppurating tissues. This is to protect fresh wounds from infectious matter, which, despite every care, collects on the various articles in a room where septic wounds are treated. Of course each room must be equipped with its own instrumentarium and appurtenances.

Dress of the patient.—The skin in the vicinity of the region to be operated is previously disinfected. The subject is not allowed to enter the operating room in his own or in the ordinary hospital dress, but in previously cleansed and disinfected loose garments.

The preparation of the solutions, aseptic and antiseptic, used in irrigating, next receive attention. He holds that if proper care be exercised in all the preparations for the operation, the danger of infection during the same can be practically excluded, and hence, that a simply aseptic solution is in that case the best irrigant.

The irritation of the wound by continued washing with an antiseptic solution would thus be avoided, and the after secretion correspondingly reduced. In fact, he thinks it would be better if we could get along without washing the wound at all during the operation.

Distilled water, free from germs, seems to fill the above demands, or still better, the well known 0.6 per cent solution of sodium chloride. In the preparation of this salt solution only water is used which has been distilled and then twice filtered. In this we have a cheap, physiologically indifferent, perfectly aseptic and germ-free irrigant.

A plan, in section, of the distilling and filtering apparatus in his clinic is given, accompanied by explanatory text. Steam is supplied from the engine room. After condensation it passes first down, then up through filters of bone black. Where the air in the reservoir has to communicate with that outside, the connecting tube contains a plug of cotton. The main reservoirs are of glass and four in number, each holding 50 liters. It is so arranged that strong salt or sublimate solutions can be conducted into these, and thus solutions of any desired strength prepared. The apparatus produces about twenty liters per hour. It can be completely taken apart for cleansing, fresh supplies of cotton, bone black, etc.

The solutions used before and during operation are as follows:

1. Six-tenths per cent salt, for washing wound during operation.
2. Sublimate (1:2000) to disinfect the skin locally, the hands of the operator, other accessories, and finally the wound itself just before applying the sutures.
3. Three per cent carbolic, for filling the instrument dishes and disinfecting the instruments.

Until recently catgut prepared by Kocher's method (carbolic acid, juniper oil, etc.), was preferred at the Kiel clinic. Some cases of slight suppuration about ligatures and sutures led to experiments with it after Koch's method. This showed that it occasionally contained viable germs. Consequently experiments were begun with sublimated catgut.

This is prepared by Kümmel's method, slightly modified, and has so far proven durable and absolutely trustworthy for antisepsis. Ordinary catgut is cleansed with soap, allowed to stand twenty-four hours in sublimate solution (1:1000), and finally preserved in sublimated alcohol (1:1000).

Some further admonitions are given with regard to carrying out the

antiseptic programme. He acknowledges that conditions (methods) are yet so far from the ideal as to prevent any one guaranteeing an absolutely aseptic course to any wound, and that our prognosis must be a little more guarded than in case of a like subcutaneous injury.

II. *Performance of the Operation.*—Attention is first called to the dangers from tissue necrosis and formation of cavities within the wound. This not only prevents immediate union, but offers the most favorable chance for the development of germs. The object of the various systems of drainage has been to avoid such cavities filled with dead matter. The more perfect antiseptics and the diminution of wound secretion now attainable have led to efforts at avoiding cavities within the wound. In this he has been so far successful that drainage has become unnecessary for nearly all wounds suited to occlusive treatment. Kocher, who has also been working in the same direction (*Volkmann's Sammlung*, No. 224) employs a one per cent bismuth solution to diminish secretion, and has recourse in severer cases to secondary suture, *i. e.*, the wound is plugged for twelve to forty hours with bismuth gauze. After removal of this, the previously applied sutures are tied, and a permanent dressing applied. This proceeding is too complicated and unpleasant to the patient to suit Neuber.

Buried sutures are next described and illustrated. Of course catgut is the only material adapted to this, and they are left to be absorbed. For very superficial homogeneous wounds close adaptation of the edges and exactly applied pressure may suffice. This, however, is not a very sure method; it may cause gangrene, or the pressure may prove uncomfortable to the patient. Where the opening is deeper buried sutures are a necessity. After removal of subcutaneous tumors, etc., he stitches the inner side of the flap, wherever it is undermined, to the bottom of the wound, and closes the edges with a continuous suture. He has then secured, in the absence of drainage, almost without exception, primary union, even after considerable operations. The cavity from extirpation of a mammary tumor he closed by first approximating the deep parts of the wound with a continuous suture. Primary union in ten days, with but one dressing. Similarly, a variety of wounds, such as those from herniotomies, castrations, etc., have been treated, and with the best success.

Where wide gaping or very deep wounds are present, successive layers of buried sutures are applied. After amputations, the periosteum is first stitched, then muscle, and at last skin. No drainage. Where several layers of sutures are thus applied, he prefers drawing the lowest one tight, and relaxing a little with each succeeding row, that whatever secretion is produced may tend to the surface.

Wherever a cavity is surrounded by bone or other unyielding walls,

the employment of buried sutures is, of course, out of the question. These cases can be managed in one of two ways—either by in-folding sutures (*Einstülpung-nähte*), or by so-called flap implantation—and this in these cases likewise prevents spaces originating in the wound.

By in-folding sutures he means such as, being attached at some distance each side from the edges of the wound, bridge it over, and by being drawn tight force the flap-edges inwards to the bottom of the wound, provided this be not too deep. The excavation is thus covered, and we can get union by first intention. For such sutures strong cat-gut must be used, with two-thirds inch distance between each one. Occasionally a stitch cuts through, or a line of skin under it dies off, but this easily heals.

Flap-implantation is suited to deep wounds of a similar nature (necrotomy of femur, resection coxae, etc.), and also in parts which, while yielding, do not permit of being drawn together (*e. g.*, in the axilla). In this method the bony prominences are removed, the flaps held down and in place by nails and in-folding sutures. Three cases of such successful operations on the femur are given. All these cases heal with depressed cicatrices. Sometimes there is great difficulty in avoiding cavities after exsection of joints. It is necessary to fit the bone-ends as closely to each other as possible. With the knee this is not difficult. Other joints, where motion is hoped for, are not so favorable, *i. e.*, the general course is more favorable, fungous relapses are rarer, and the mortality is less, while, on the other hand, retention of function occurs less frequently.

A case of successful exsection of ankle-joint, no drainage, is shown. First bandage remained forty-two days, when all was healed and no sup-puration. He promises further details of the method as applied to the hip and shoulder-joint.

Natural Drainage.—The means taken, and so largely successful, to avoid artificial drainage do not entirely settle the question. He has not in all cases felt so sure of his antisepsis as to close the wound tightly with sutures. He therefore prefers, after longer operations, to leave certain efferent openings as safety valves. The more rapid the operation and the securer the antisepsis the less need for such extra precautions.

The direction of the incisions is important for the natural drainage. The external cut should be at one or more points opposite the lowest parts of the wound. This can generally be accomplished by curved incisions, which are otherwise also to be preferred. After larger resections, extirpation of suppurating tissues, etc., he arranges so that the lower angles of the wound shall remain a little gaping. This can be gained by care in putting in the stitches, one edge, if necessary, being displaced

longitudinally, just enough to make the end of the cut gape. He figures a resected knee, where the opening is preserved by a depressed tongue-like flap, formed by giving the ending of the transverse cut a Y shape. This little tongue, after being sewed down, formed an excellent floor for any secretion forming to flow over. After larger resections no suture is applied to the lower ends of the incisions.

The shorter an operation lasts the less danger of infection.

Finally the results of 85 operations (all those occurring in the clinic since Nov., 1883, have been treated on these principles) are tabulated. They include 14 amputations and exarticulations, 21 resections and osteotomies, 8 necrotomies, 2 abscess extirpations, 23 removals of tumors, 6 other operations and 11 injuries. Of these 41 (48.24 per cent) were absolutely primary unions, 27 (31.76 per cent) were primary unions, except small superficial granulations at the points where openings had been left; 14 (16.47 per cent) were primaries beyond fistulas, sores, and small abscesses. In 3 (3.53 per cent) there was vigorous suppuration. A cure was reached in all the above cases except one of the last class, which was still under treatment. He contends that no one has succeeded better with drainage tubes. Drains, he considers, are a safety valve for imperfections and mistakes in the operations. The less confidence the operator has, the less trust in his collective arrangements and antiseptic preparations, the more occasion for him to retain drainage.

WM. BROWNING.

ON BRANCHIAL CYSTS OF THE NECK. By N. SENN, M. D. Reprint from the *Journal of the American Medical Association*. 1884. 12 mo., pp. 44.

Cystic tumors of the neck, which owe their origin to imperfect closure of one of the branchial tracts, form the subject of an elaborate memoir, which was presented by the author before the surgical section of the American Medical Association, at its meeting in May, 1884. These tumors originate from congenital defects of development, the matrix being composed of tissue which remains in its embryonal state for an indefinite time, and later, by proliferation of its epithelial elements, gives rise to a distinct and characteristic type of cystic tumors. The primary origin of these tumors necessarily must correspond to the location of one of the branchial clefts, and clinical experience has demonstrated that they are most frequently found in the region of the second and third clefts, in the vicinity of the larynx, pharynx, and in intimate relation with the sheath of the large vessels of the neck. They appear to occur more frequently on the left side of the neck. Their shape is invariably round or oval, with a smooth surface. The only histological

elements in the contents of these cysts are epithelia, and the physical and chemical properties of the cyst contents will depend largely on the amount and degree of retrograde transformation of this epithelial proliferation. It is only during the earliest stage that the specific secretion is found in its purity. While dermoid cysts contain the characteristic secretions of the skin and its appendages, the branchial cysts only contain the products of the epithelial cells, because their walls do not contain any hair follicles, sebaceous or sweat glands, as the branchial clefts close before these appendages are formed. These considerations form the substance of the introductory portion of this memoir, after which the author proceeds to consider their classification according to the nature of their contents, into *mucous*, *atheromatous*, *serous*, and *hæmato* cysts. This classification is one of importance only in its bearing upon questions of diagnosis. Some discussion of the characteristics of each of these groups next follows, far the largest amount of space being given, however, to atheromatous cysts. The atheromatous material which characterizes them resembles the contents of an ordinary retention cyst of the skin, with this difference, that they never contain anything that resembles the products of hair-follicles, as lanuginose hair or sebaceous material, or any of the more complicated products of dermoid cysts. Three cases of atheromatous branchial cysts have come under the observation of the author. These are detailed in full, together with the operations for their extirpation. In the course of one of these operations, the internal jugular vein was wounded. A lateral ligature of catgut was applied, arresting the hæmorrhage. The operation wound healed by primary union, an intense headache for the first twenty-four hours being the only symptom that could be referred to the interference with the vein. This case served to emphasize the fact, which had been illustrated in cases reported by other observers, that firm adhesions to the sheath of the deep cervical vessels are the direct result of prolonged irritation and inflammation in the walls of the sac and the adjacent tissues.

Severe branchial cysts, which have been more frequently described under the designation of congenital hydroceles of the neck, though they are often congenital, or appear during infancy or childhood, may yet appear later in life upon the advent of adequate determining causes.

It is the author's opinion that there are undoubtedly many instances where remnants of foetal tissue remain latent in the branchial tracts throughout a life-time for want of an adequate exciting cause, which may be required to call into morbid activity the slumbering power inherent in the histological elements of the matrix. Serous branchial cysts are the most frequent, and they are more likely to develop early.

Branchial cysts of the neck, as compared with other tumors in this locality, are of rare occurrence. The differential diagnosis is often no

easy task. They are most frequently confounded with dermoid cysts, a mistake of little practical moment, as both require the same treatment. An examination of the contents of a cyst and of its walls will furnish the necessary data for differentiating them. A branchial cyst contains only one constant histological element—epithelium; a dermoid cyst contains the products of the secretions of the skin and the organs which it contains. The walls of a branchial cyst are composed of a connective tissue capsule lined with epithelium, while on the other hand, the sac of a dermoid cyst is composed of true skin. A deep-seated isolated caseous lymphatic gland might be easily mistaken for a branchial cyst, and multilocular cysts, the result of lymphangiectasis, and simple serous cysts, developed without a particular matrix as new formations in the connective tissue, are to be distinguished only by the endothelial lining of the inner surface of their sacs.

Branchial cysts always remain purely local affections, and manifest no tendency to destroy life, except when they are of sufficient size to interfere, by their presence, with the performance of important functions of neighboring organs. They manifest no tendency to spontaneous cure, and prove exceedingly rebellious to all forms of treatment short of complete extirpation. Their tendency is to increase in size until they encroach upon important organs, when the suffering and distress which they occasion call for decided and effective operative relief. The best plan to pursue is to make an incision over the most prominent portion of the tumor, and, in case the adhesions can be separated without endangering the deep cervical vessels, the entire cyst should be removed. If inflammatory infiltrations obscure the field of operation at the base of the tumor so that complete extirpation is especially perilous, then the anterior and lateral walls should be excised, and the epidermal matrix forming the base, adherent to the sheath of the cervical vessels, should be destroyed completely by the actual cautery. In the case of infants and very young children suffering from large serous cysts, drainage under antiseptic precautions might first be employed as a tentative agent.

This monograph is worthy of careful study. It is a clear and systematic treatise upon a group of tumors, the true etiology of which has not hitherto been appreciated by English-speaking authors, and the existence of which, as a class, has escaped observation. Nevertheless, as has been well elucidated in the memoir of Dr. Senn, the location, anatomical characteristics, natural history and operative requirements of these tumors are so inseparably related to their etiology that their distinct classification according to that etiology is of importance.

L. S. PILCHER.

CLUB-FOOT.—IS EXCISION OF THE TARSUS NECESSARY IN CHILDREN?

By DE FOREST WILLARD, M. D. *Transact. Med. Soc. Pa.*, 1884.
Reprint, pp. 29.

This is a critical examination of the literature of tarsotomy for the relief of extreme cases of deformity in club-foot, together with a statement of the author's own methods and results. To it are appended tables of published cases of: I. Excisions of the cuboid. II. Wedge-shaped excisions of the astragalus. III. Wedge-shaped excisions of the tarsus (true tarsotomy). The conclusions arrived at by the author are as follows:

1. Even severe cases of talipes should not be considered incurable by moderate means, simply because they have relapsed after imperfect treatment by either surgeon or patient. Careful supervision may still accomplish a good result.

2. In children under ten, even in extreme degrees of deformity, powerful manual force, with subcutaneous division of all the contracted tissues, will restore the foot without section of the bones, and should be first attempted. The degree of force required may be very great, but even if carried to rupture of tarsal ligaments, still leaves the injury subcutaneous. Should the hand fail, screw power is allowable.

3. Fixation in gypsum splints in the straight position for a few weeks, followed by persistent manipulation, and the use of apparatus, will give a better walking foot than is attainable by resection.

4. Tarsotomy is a valuable operation in cases which defy ordinary treatment, especially in adults, where the bones are irreducible and the ligaments strong. The operation should always be done antiseptically. The removal of a wedge-shaped piece is preferable to either excision of the astragalus or of the cuboid, the latter giving the poorest results.

L. S. PILCHER.

MINOR CONTRIBUTIONS.

THE USE OF VULCANIZED (HARD) RUBBER FOR HANDLES ON SURGICAL INSTRUMENTS.

With a view of aiding surgeons in their efforts to advance the principles of thorough cleanliness in surgical operations, and in the treatment of wounds, I have of late considered the importance of having instruments, which shall be free from unnecessary embellishments, such as chequered or file-cut handles on knives, forceps, etc., etc., which have heretofore been made of wood, ivory, bone, etc., which absorb moisture, and which must be riveted or glued on the blade, always leaving a crevice into which objectionable material can settle. To overcome these objections, vulcanized (hard) rubber has of late been successfully employed. The nature of this material is so well known to the profession, that a description would here be superfluous. I would simply call attention to the fact that it is absolutely impervious to moisture, and on being well polished receives a very smooth, and what might be called an encrusted surface, thus rendering it free from a tendency to receive and harbor any substance which might impregnate parts with which it comes in contact while in the hands of a surgeon. In order to produce instruments, such as amputating or minor operating knives, obstetric forceps, etc., that shall neither have crevice nor corner into which septic material may settle, or from which such can not be easily removed, it is necessary to have them practically of one piece, to have the handles, as well as the blades, smoothly finished and polished.

In making, for example, an amputating knife of one piece, so that the handle and blade shall be forged from a single bar of steel, we find that, aside from the difficulty experienced in forging and finishing, the handle will overbalance the blade to such a degree that the instrument feels clumsy and uncomfortable to the operator. To overcome this latter objection, knives have been made with so-called "solid handles," but which, in fact, are made by soldering two concave pieces of brass, or other metal, together to make a hollow handle, then soldering the shank of the blade into or between them, and covering the whole with nickle-plate to give it the appearance of a solid mass. These will hold together for a time, but if used to any extent the solder will gradually become disjoined, and you find a crevice along the edges of the handles, forming receptacles for impurities. The knives to which I wish to call attention have hard rubber handles, which are placed upon the shank of the knife in an unvulcanized state, great care being taken to have the mass adhere firmly to the steel, after which it is vulcanized by the usual steam process, and becomes so firmly connected that nothing short of a heavy blow from a hammer will remove it. This enables one to polish both blade and handle at one sitting, and also to avoid the necessity of using ferules, thus rendering the place of union so smooth that it is perceptible only by the difference in color. These hard rubber handles (baked on steel) have also been used on a number of general instruments, such as obstetric and needle forceps, saws, chisels, etc., etc. At Prof. Chas. Jewett's suggestion, obstetric forceps have been made with the entire handles surrounded by rubber up to the back, where it is finished off even with the

shanks. The advantages gained here are at once perceptible, since it is not necessary to screw the handles on, in which case there is always a crevice between the blade and handle, and in the heads of screws. The well-known Russian needle-holder has also been made on this principle, and thus rendered aseptic. Other instruments, such as eye instruments, chisels, saws, etc., have been made in the same manner for Prof. Wyeth. I would beg to add, that I do not mean to imply that placing hard rubber handles on instruments renders them aseptic, but call special attention to the fact that they must be accurately and permanently cemented before vulcanizing, and finished without angle, crevice or roughness. I am confident that the subject of making instruments that may be thoroughly cleansed is an important one, and, with the aid of surgeons in sympathy with the principle, hope soon to have them for every department of surgery.

J. A. PFARRE,

Of Geo. Tiemann & Co.

DIPHTHERIA AND TRACHEOTOMY IN LEIPSIC.

By WILLIAM WALDO VAN ARSDALE, M. D.,

OF NEW YORK.

DURING the last few years, and especially during the winter of 1883, there has been a notable increase in the number of cases of diphtheria on the Continent and in England, where several smaller epidemics have been observable, but especially in Paris and in some parts of Germany. In this latter country the city of Leipsic was especially prominent as having been the seat of an unusually severe epidemic of this kind, which was specially remarkable for its malignant nature.

Reference to this epidemic has been made by M. Taube, of that city, who published his observations in a book entitled "Die Entstehung der Menschlichen Rachen Diphtherie,"¹ notice of which is taken in the *Chirurgisches Centralblatt*,² and a more detailed account has been given of it in the proceedings of the Medical Society of Leipsic, by Prof O. Heubner of that city, the well-known author of the monograph on Experimental Diphtheria,³ receiving the prize awarded by the Empress of Germany for the best essay on the subject, incitement to which was perhaps given by such frequent opportunities for observing the disease in that city.

¹ Leipsic, C. Reissner, 1884.

² 1884. No. 28; July 12.

³ Leipsic, Vert & Co., 1883.

It having been the fortune of the writer personally to observe this epidemic, more especially in some of its surgical aspects, and since the subject of the surgical treatment of croup and diphtheria is always of renewed interest, the operation of tracheotomy itself offering, like few other surgical operations, ever fresh attractions to the surgeon, he has thought a communication of his experiences in this line would not be entirely devoid of interest, even though they contain nothing entirely new or of extended import.

During the time of my residence at the Leipsic City Hospital in the character of assistant to Geheimrath Prof. Thiersch, it devolved upon me to conduct the surgical ward for diphtheria from the end of October, 1883, to the end of March 1884; and during this time I had the opportunity of observing nearly one hundred cases of diphtheritic croup.

This period happened to mark the height of the epidemic alluded to; so great a number of diphtheria patients was unusual at that hospital, although diphtheria having been of late years endemic in Leipsic, and the city never having been entirely free from cases of this kind, the department for operative cases of diphtheria had not been unoccupied for several terms.

The sudden increase in these numbers, which marked the beginning of the epidemic, was traceable to the end of September and the month of October, 1883; but when I took charge of the ward, at the end of October, the numbers were still on the increase. The parts of the town from which the greatest number of cases were admitted in the beginning of the epidemic were the most densely populated, and inhabited by the poorer classes. But during the winter the disease attacked other parts of the town as well, and particularly the West Side, which not only possesses the most favorable sanitary conditions, but is inhabited by the wealthiest class of citizens. My experience being restricted almost entirely to the aspect of the epidemic as reflected in hospital practice, I am not qualified to give any more particulars on these questions, however interesting they may appear. I will merely mention an observation made by Prof. Hubner, the director of the district dispensary, that the manner in which the contagion manifested itself was of a singularly slow, creeping nature, yet

at the same time of a very persistent, adhering quality; so that although it was generally certain that the houses in which cases had occurred would, in course of time, be the seat of other cases, yet the space of time elapsing before the recurrence might be several weeks or months.

The treatment of diphtheria by incision of the trachea, whenever symptoms threatening asphyxia appeared, being almost universally established in Germany, as soon as a case of this kind occurred in medical practice among the poorer classes, who could not provide skilled nursing, and in whose house the operation could not be satisfactorily conducted, the advice was usually given to send the child to the hospital. It thus happened that often four or even five cases a day were presented for operation. But, although most always a speedy removal to the hospital had been advised, from very natural motives the children were frequently brought to the hospital in the latter stages of asphyxia. In all such cases the operation was performed at once, without further delay, so soon as the consent of the parents was given. But in other cases, where there was no danger in waiting, the children were placed in the diphtheritic wards, generally separated from the operated cases, for observation. If, however, patients applied for admittance who manifested only the first symptoms of the disease, they were placed in the internal medical department, and not transferred to the surgical wards until some indication for operating was set up.

The number of patients thus admitted during the time I had charge of this department was eighty-eight, and I had the duty of determining the time of operating and of performing the operation. Only five cases were not operated for want of indicating symptoms, two recovering without operation, the three others dying within twenty-four hours after their admission, with symptoms attributable to lung affections and asthenia, but without marked laryngeal or tracheal obstruction, in the same manner as when death occurred among the patients of the medical department.

In some cases, patients were admitted during the hours of clinical instruction, and these were operated by Prof. Thiersch himself, before the class. This occurred seven times during the period mentioned; and nine times my colleagues kindly

operated for me, during temporary absence on my part, in cases where speedy relief was urgent.

I have not included in this account some cases where patients were transferred from the medical diphtheria department on account of symptoms indicating operative treatment (and which I operated on), but which had to be transferred back again on account of the case being complicated with scarlet-fever or with measles, and because they could not, without danger for the other children, be admitted to the same room as the other operated cases.

Neither are those cases mentioned which occurred outside of the period referred to, and in which I performed tracheotomy in a similar manner for my colleagues, when they were prevented, nor those in which the operation was performed for adults lying in other wards.

Before turning to the operation itself, it is of interest to glance at the history of the surgical treatment of diphtheria prior to this date in the city of Leipsic, for the purpose of facilitating a comparison of the results obtained during the epidemic with those of earlier date.

While, according to the list of operations for croup kept in the clinic, only a single case occurred in the year 1876, which also ended favorably, there were, in 1878, 20 out of 24; in 1879, 27 out of 39; in 1880, 30 out of 44; in 1881, 23 out of 28; in 1882, 30 out of 46; and in 1883, 112 out of 129 cases that ended fatally. The very high mortality of 86.8 per cent in 1883 is already due to the epidemic which, as will be shown later on, was characterized by a high death-rate. But the previous years as well show a high mortality, especially the years 1878 and 1881 (83 and 82 per cent), which may be laid to account of the *genus epidemicus*, in some years the nature of the cases being totally and persistently different from others, the percentage of deaths in 1882, for instance, being 65.2. The increase in the number of cases each year may be ascribed to the growth of the city, as other diseases as well showed a similar increase.

It is of interest to know what influence the occurrence of exfoliated tracheal or bronchial membranous exsudates and pseudo-membranous formations on the tonsils had upon the final termination of the disease. The following table shows

the percentage of cases where membranes were stated in the hospital journals as having been ejected from the trachea during or after operation :

Year.	Cases with membranous exsudate in trachea:			Per cent. stated	Deaths.	Per cent.
	Membr.	No Membr.	Not Stated.			
1878	7	4	13	(28.7)	4	59.1
1879	21	10	8	(53.8)	16	76.2
1880	22	8	14	(50.0)	9	40.9
1881	17	5	6	(60.7)	12	70.6
1882	26	5	15	(56.5)	18	69.6

In the following cases membranous deposit was noted as having been especially well marked in the fauces:

Year.	Well-marked cases of tonsillar diphtheria.	Deaths.	Per cent.
1878	10	10	100
1879	15	13	86.6
1880	13	10	76.9
1881	22	18	81.8
1882	18	14	77.7

The influence of the ages of the children on the course of the disease is best seen from the following tables, in which the two last columns, marked M. and D., state the per centage of deaths of those cases in which membranes were expectorated, and in which faucial diphtheria was well developed, respectively, and as noted :

Year.	Age.	Cases.	Death.	Per cent.	M.	D.
1878	1	8	8	100	100	100
	2	1	1	100	—	100
	3	3	2	66.6	0	100
	4	5	5	100	50	100
	5	1	1	100	—	—
	6	4	4	100	100	100
	7	1	0	0	0	—
	8	1	1	100	—	—
1879	1	4	3	75	100	100
	2	6	5	83.3	100	100
	3	5	1	20	0	100
	4	9	6	66.6	83.3	100
	5	7	6	85.7	100	100
	6	3	1	33.3	0	0
1879	7	3	3	100	100	100
	8	0	0	—	—	—
	9	1	1	100	—	—
	21	1	1	100	—	—

Year.	Age	Cases.	Death.	Per cent.	M.	D.
1880	1	9	9	100	100	100
	2	7	5	71.4	50	50
	3	11	6	53.6	33.3	100
	4	5	2	40	0	0
	5	2	2	100	100	—
	6	4	3	75	66.6	100
	7	2	1	50	—	50
	8	1	0	0	0	—
	9	2	1	50	50	—
	12	1	1	100	100	100
1881	0	1	1	100	100	100
	1	4	4	100	—	100
	2	3	2	66.6	0	66.6
	3	6	5	83.3	100	83.3
	4	4	3	75.5	66.6	50
	5	6	5	83.3	75	83.3
	6	3	2	66.6	100	50
1882	11	1	1	100	100	100
	1	5	4	80	66.6	—
	2	12	11	91.6	85.7	85.7
	3	9	6	66.6	100	80
	4	9	6	66.6	80	75
	5	7	2	48.6	20	50
	6	2	1	50	0	—
	7	2	1	50	50	50

These tables show, in a similar manner to numerous other ones published, that the death-rate after tracheotomy is higher in patients under two years of age, and that the occurrence of pseudo-membranes still increases the probability of a fatal termination—results not much differing from those obtained during the epidemic, to which the reader's attention is now invited.

The ages of the children admitted on and after October 30th, 1883, ranged from seven months to fourteen years, the average age being 3.9, or nearly four years—the average age of those cases that were cured being 4.75, and of the fatal ones 3.77.

The following table gives the direct percentage of deaths according to the ages:

Years.	Cases.	Deaths.	Per cent.
0	5	5	100
1	8	8	100
2	23	21	91.3
3	20	17	85
4	6	5	83.3
5	9	6	66.6
6	3	2	66.6
7	6	4	66.6
8	1	1	100
9	5	5	100
12	1	1	100
14	1	1	100
	<hr/> 88	<hr/> 76	<hr/> 86.4

The children were mostly from the families of the better working-class, very few from those of day-laborers, and a few belonging to classes of higher social rank.

The manner in which the first symptoms of the disease appeared was singularly similar in most cases. Generally the little patients would be seized only a very few days (on the average 4.9 days) before being admitted to the hospital; and those cases where the course of the disease was a rapid one show a greater percentage of fatal cases (89 : 78); and with reference to the ages, it can be shown that those of a tender age (under three years) presented a shorter period of illness prior to their admission than did those of four or five years of age.

Those cases, however, of maturer age (of eight or nine years) were again marked by the singular rapidity of the course of disease—as they also showed a high percentage of mortality.

The disease began in nearly all cases with a cold in the head, coryza, headache, coughing and hoarseness of voice, fever and dyspnoea setting in as the disease advanced. Coughing and soreness of the throat were most usually the earliest symptoms noticed by the parents, being given in about 72 per cent. of the cases; coryza, in about 33 per cent.; while, very rarely, difficulty of swallowing and abdominal pains were complained of. Apathy and general debility were frequently the only symptoms complained of at all; and frequently the children had had previous attacks, from which they had quite recovered, before a recurrence set in from eight to ten days later.

The patients thus admitted to the hospital were at once placed in their proper ward. They were frequently bathed, and kept in bed; their principal diet consisted of good milk and mild Hungarian wine, chiefly fluid food being given to the older children as well. A rubber bag filled with small pieces of ice was tied about the throat.

Every local application to the fauces was abstained from, and no surgical treatment was attempted until tracheotomy was necessitated; it being held that any mechanical interference might possibly, by producing new anatomical lesions, afford new opportunities of entrance for the elements of contagion into the system. For the most part, no medicine was given internally, although previously the usual remedies had repeatedly been tried; the practice thus differing from that of the medical department in the earlier stages of the disease, as will be seen further on; only in cases where diarrhœa or other accidental diseases were present, these were treated in the usual manner.

During the whole time of the occupation of the wards, however, large sprays were continually kept in action, partly for the relief of the patients operated by incision of the trachea, in order to afford them moist air for respiration, partly to disinfect the atmosphere and the wards from the contagion of diphtheria, partly, also, to endeavor to exercise some influence on the disease itself. Pure water, carbolic solution, and other antiseptics were used, solution of boric and salicylic acid (24 and 4 pro mille); also a spray containing sulphurous acid *in statu nascendi*, prepared by mixing a teaspoonful of a solution of 20 parts of lactic acid and 80 parts of water with a wine-glassful of a solution of 20 parts of hyposulphite of sodium and 1000 parts of water. A spray of a solution of corrosive bichloride of mercury was also used, in very great dilution (1 in 100,000). Many of these had disadvantages connected with their use: the sulphurous acid affected the mucous membranes of all the inmates of the room, and the bichloride could not be continued for a great length of time. But what was found to be the most agreeable, both on account of the refreshing odor and its lack of noxious properties, was a solution of the oil of eucalyptus, held in solution by the help of a little alcohol; though even this, if too much alcohol were added, would prove irritant to the conjunctivæ of the nurses.

In regard to the general state of health presented by the patients admitted, many were proportionately large, well developed and healthy-looking; but these very generally presented the disease in its severest forms and with a fatal termination; so much so that the nurses bringing the children into the operating-room used to count such cases as lost, saying: "He's too fine a boy to get through." Conversely, those cases that recovered generally were ill-nourished, weakly and small of size.

The majority of cases presented diphtheritic pseudo-membranous deposits on the tonsils, namely about 72.7 per cent., including those cases of gangrenous character. Quite a number exhibited diphtheritic affections of the nose, 22.7 per cent., and one case, or 1.1 per cent., showed slightly developed diphtheritic conjunctivitis. The mucous membrane of the mouth and lips appeared affected in 11.3 per cent. of the cases, and not unfrequently the entire mucous lining of all parts of the mouth would be the seat of diphtheritic inflammation. No deposit was found in the mouth in eighteen cases, or in 20.4 per cent. of the cases; only a slight swelling and deeper coloring in 13.6 per cent., and nothing at all in 6.8 per cent. Yet these latter cases showed only a proportion of 5 : 13 of recoveries; and 66 per cent. of those cases, which showing only laryngeal symptoms might be classed as diphtheritic croup, proved fatal; a purely local affection of the larynx, not followed by any general symptoms, only being present in one-third of these cases, and these, although they were not all free from membrane formation in the trachea, recovered.

None of the cases in which diphtheritic affections of the nose were present recovered; neither did any of the severer lesions of the mucous membrane of the mouth.

Of the cases presenting tonsillar diphtheritic affections only a very slight percentage, namely 10 per cent., recovered; and these cases are of special interest, not only because this is most usually the first appearance of the disease—for, if the disease be one of the entire system, it is here first localized—but also because it may be the primary focus from which the disease is imparted to the system, since we know that in the tonsils a very active permigration of the itinerant elements of the economy through the tissues is kept up, and as experience tells us

how even a slight affection or inflammation of the tonsils is of great influence on the system and produces quite disproportionate general symptoms.

None of the symptoms hitherto mentioned had any influence on the performance of the operation of tracheotomy. Neither the age of the patient, nor his general bodily condition, nor the temperature, nor the local appearances above the larynx, were, as a rule, allowed to interfere with the fulfilling of the indications set up by symptoms pointing to obstruction of the air-passages. Believing the operation of tracheotomy itself to be not altogether entirely free from danger, especially when it is performed for severer cases of diphtheria—on account of the risk incurred of the wound becoming a focus of specific inflammation which might prove a source of infection fatal to the system—it was nevertheless considered a duty to give every patient threatened with asphyxia the benefit of a chance of recovering, by the incision of the trachea.

In the hospital there was no need to fear bringing the operation into disrepute, for the children were delivered there that they might obtain every chance of recovery, and the practice had been adopted that whenever a child was transferred to the surgical ward, a paper signed by the parents must accompany it leaving the decision of the necessity of the operation to the surgeon at hand. Nor was there any call to pay special regard to statistical considerations, and no cases were in any way selected out for operation as being likely to promise success.

In the cases operated the complex of symptoms pointing to obstruction of larynx and trachea was present, consisting of the respiratory murmur of stenosis of the larynx, most always audible at a considerable distance from the patient, and often combined with the well-known croupy cough; the sinking-in of the yielding parts of the thorax, the epigastrium, the intercostal spaces, the jugulum, etc., during inspiration; and, in connection with these, usually aphonia, general dyspnoea, a more or less marked cyanosed condition and anxiety on the part of the patient; to which may be added the torpor induced by deficient oxidation of the blood.

These symptoms were already present in many of the little patients admitted, as has been remarked above, so that the performance of the operation could no longer be delayed; an early

operation being in general advocated, to preserve the strength of the child, so quickly spent in fruitless inspiratory struggles, and prevent an overcharging of the blood with carbonic acid, and to escape the detriment done to the lungs by the continued action of the rarefied air (caused by these fruitless efforts of inspiration) upon their respiratory surfaces; yet it was held that the operation should not be performed until thoroughly indicated, so as to allow of a chance of recovery without operation.

The operation was performed on the same day in 92.7 per cent. of the cases, and only in six cases did greater lengths of time intervene between the admission and the operation. This is easily explained by the observation made above, that the parents did not as a rule present the children at an early date. The phenomenon of inspiratory retraction of the epigastrium and intercostal spaces was present at the time of operating in all cases, with the exception of four, where the indications for operating were given chiefly by the stenosed breathing. Aphonia was well-marked in fifty-nine per cent. of the cases, while severer dyspnœa was present in 39.7 per cent. The little patients were more deeply cyanosed in 74.7 per cent. of the cases, and this is the only symptom of this group which shows an especially depressing influence on the mortality percentage.

Four patients were brought in in a completely asphyxiated condition, and were operated upon immediately and recovered after the air was freely admitted to the trachea, doing well the following days, though none entirely recovered. During the operation itself no deaths occurred, although quite frequently the respiratory movements would become clogged and were not again brought into action till the obstruction in the trachea had been removed by artificial means.

The operation itself was performed in the following manner:

The child, clad in its shirt and wrapped in a blanket, having been placed on the operating table, chloroform was administered by an assistant or one of the nurses, by means of Junker's inhaler. Only sufficient chloroform was given to enable the child to breathe quietly and to overcome convulsive movements. After the incision through the skin had been made, the most painful part of the operation, very much less chloro-

form was administered, as not being necessary, to keep the child quiet, and frequently after the first cut it could be wholly dispensed with, the quantity of carbonic acid retained in the system no doubt contributing toward a complete narcosis. If the child showed signs of distress during the rest of the operation a few more whiffs of chloroform-vapor were sufficient to subdue the struggling. It thus was possible so to regulate the anæsthetic, that as soon as the operation was finished the child had generally opened its eyes, which was combined with the advantage of insuring a greater sensitiveness of the tracheal mucous membrane, thus forcing the patient to expel any fluids which may have entered into the trachea during the operation, and to eject any detached obstructions present. Moreover the parents generally, waiting in an adjoining room to learn the result of the operation, were frequently disconcerted if the children remained too long narcotised. On the other hand a too early suspension of the anodyne generally heightened the irritability of the trachea produced by the pressure of the canula, causing convulsive coughing with danger of setting up emphysema.

Deaths from chloroform did not occur during this period, and special attention was always given to suspending its administration at the proper time, the administration being always under direct control of the operator himself. In those cases of severe asphyxia, or where the dark-blue cyanosed appearance of the face evidenced an intoxication with carbonic acid, the anæsthetic was not given at all, as unnecessary. No other anæsthetic than chloroform was employed; but a special inhaler was kept for use in diphtheria cases. When the patient was sufficiently under the influence of chloroform, a cushion was placed under the neck and the head allowed to fall well back; the incision in the median line being made through the skin and its adjacent tissues by means of a ridge taken up between the thumb and forefinger of the operator and his assistant. Then between two pairs of forceps the cut was lengthened, the deep layer of fascia cut through and the group of sternohyoid and thyroid muscles laid bare. If this could not be done without wounding the engorged veins of the anterior jugular venous plexus, which, however, could usually be pushed aside and left unmolested, they were caught in hæmostatic

forceps of Kæberlé or Péan, which also at the same time served to open up the operating space. Next these anterior muscles of the neck were divided in the aponeurosis and pushed to either side, laying bare the thyroid gland encased in its envelope of connective tissue. Occasionally these muscles being well developed would present no discernible aponeurosis, when an artificial separation would have to be made, ensuring the location on the median line by feeling for the trachea with the left forefinger. Having laid bare the gland with its sheath of fascial tissue, this tissue was next followed up to where it attaches to the larynx, without injuring the gland. To find the point of attachment is the most difficult part of the operation, since it varies considerably in different cases. Although most frequently and typically it attaches to the cricoid cartilage, it as often was found to attach higher, as far up as the superior notch of the thyroid cartilage; and again when the thyroid gland is diminutive the trachea lies exposed directly beneath the ribbon-muscles, being covered only by a thin layer of tissue. Having separated the fascia from the cricoid cartilage by means of transverse cuts with the knife through the fascia laryngo-thyreoidea, and freed the gland from the lateral ligamentous connections with the larynx, one can, without much difficulty, introduce some dull and broad-pointed instrument behind the gland, and tearing through the loose alveolar tissue between the gland and the trachea, pull down the gland so far as to expose the upper two or three tracheal rings. For this purpose a Langenbeck's blunt retractor was generally used.

The next step was to still any bleeding, which, if the incision could be made at the cricoid cartilage, was usually very slight; but if the gland had become in any way lacerated, or extended very far up, was occasionally more considerable, on account of the frequent occurrence of smaller branches of the superior thyroid arteries. After which there remained but to incise the trachea with a pointed knife, assist the expulsion of any obstructing loose formations, and having previously passed a silk cord through either side of the trachea near to the place of incision, for the purpose of easily keeping the opening dilated in case of having to remove or change the canula, to insert the double canula, and tie it on; the ligaturing of the arterial vessels

caught in the forceps having been accomplished at leisure, and the wound disinfected either with iodoform in coarse powder or with corrosive sublimate in solution.

This operation of tracheotomia superior was the most frequent mode of operating, it being preferred, if there was no necessity for choosing another method, for the reason that the hæmorrhage is likely to be less on account of the smaller number of blood-vessels met with; and in making the entrance into the trachea above the gland, there is not so much danger of opening up lymph-ducts and passages between the loose connective tissue leading down to the mediastinum, and thus giving opportunities for extended inflammations and the downward burrowing of pus. Moreover, the gland being pulled down serves as a sort of a cushion for the canula to rest on, so that the position of the canula inside of the trachea is more easy.

For these reasons the operation described was performed in 79.5 per cent. of the cases operated upon.

The other cases however, three in number, the operation known as tracheotomia inferior was performed, when the other operation had to be given up on account of the gland reaching too far up over the laryngeal cartilage; here not only the great vessels of the root of the neck are in close proximity, and occasionally the thymus gland, but also the arteria thyroidea ima and irregular branches of the inferior thyroids and the inferior thyroid venous plexus. The distance, moreover, of the trachea from the surface of the skin is greater than at a point nearer the larynx.

In some cases the isthmus of the thyroid gland would be somewhat narrow although projecting very far upward beyond the cricoid cartilage. This variety occurred in six of the cases, and in these an aneurism-needle could be passed under the isthmus, a double ligature tied and the gland severed between the ligatures without much difficulty.

In six other cases, not included in the number given above, the cricoid cartilage had to be incised in addition to the tracheal ring or rings, from necessity to speedily end the operation; but this was always, if possible, avoided, for the reason that the canula, if too near the glottis, produces continued irritation and also because the trachea here presents the smallest calibre

and the greatest rigidity, owing to the cricoid cartilage not having a ligamentous part in its posterior portion.

On one occasion, when there was danger in delay, the isthmus was found to be so long and narrow that it could be easily pushed aside and the trachea entered from the front. In another case the child having a very short neck and a very largely developed gland, and becoming asphyxiated immediately after the commencement of the operation, way had to be made into the trachea directly through the thyroid gland, the profuse bleeding having to be stanchcd afterward, an inverted position of the child being maintained meanwhile to prevent as much as possible the aspiration of blood. By this means the child recovered as soon as the canula was inserted. Profuse hæmorrhage during the operation only occurred once beside this case; but twice during the after-treatment hæmorrhages, more or less profuse, set in; both times, however, in those peculiar septic conditions of the wound, when the blood appears very thin and watery and not very easily coagulated; and both these cases ended fatally, though not in immediate consequence of the hæmorrhage.

The immediate effect of nearly all of these incisions of the trachea was comparative ease of respiration, and it was pleasant to demonstrate the change so quickly procured to the anxious parents, whatever apprehensions as to the final result had to be imparted at the same time. Immediately after the opening of the trachea a short period of apnœa set in; but in the greater part of the cases relief was not obtained till pseudo-membranes of smaller or larger dimensions had been removed (in 55.4 per cent.); and in many other cases membranaceous formations were afterwards expelled, either through the canula or on its removal. In 32.5 per cent. of the cases no membranes were brought to view, the obstructions either being caused by viscid mucous matter in the glottis, or the pseudo-membranes disintegrating and being expectorated with the mucous exsudations, and in these cases the greater proportion of recoveries could be observed, namely 22.2 per cent. to 5.9 per cent. In those cases, however, usually demanding the utmost despatch, where mechanical means had to be employed to clear the trachea of its obstructions, small, soft quill feathers, cut to suit the purpose, were found best adapted;

in other cases a large sized elastic catheter, communicating with an evacuating syringe, did good service, though in a couple of cases the mouth of the operator was applied in preference.

These membranaceous formations, their exfoliation and their disintegration formed the principal source of anxiety after the introduction of the canula, as the case had to be largely intrusted to the trained nurses.

During this period the use of instruments in clearing away obstructions below the canula was always avoided as much as possible, it being preferred to remove the canula; but the feather and catheter could not always, even then, be dispensed with; often a few drops of a solution of salicylic acid into the trachea was of very good service, combining a mild irritation of the mucous membrane to promote expectoration with a dissolving action upon the viscid mass to be thrown out.

The manner of expectorating was indeed of great practical value in correctly estimating the character of the case, in so much that those little patients that did not expectorate freely after the operation usually died comparatively soon.

Death after operation occurred in periods ranging from one to twenty-one days, the greatest number of cases, 29.7 per cent. dying on the second day after operation, and 5.4 per cent. on the twelfth day, the average being the fifth day (or 4.7).

Those cases which progressed the most favorably were impeded by no complications; the perforated canula was substituted for the first one used most frequently on the fifth day (once on the second and once on the eleventh); the canula could be entirely removed after a period, dating from the operation, of 9.2 days on an average, the shortest term being eight, the longest, twenty-one days. In no case did any formation in the larynx prevent the removal of the canula; but in one case a paresis of the muscles of the glottis had somewhat retarded it.

In regard to the number of successful cases remaining free from complications, 50 per cent. showed no complications; only two with lung symptoms recovered, and these only presented light bronchitis; two cases, where the infection had

been imparted to the wound, and four cases, where the swelling of the submaxillary glands was well marked, recovered.

By far the greater number, however, succumbed to further manifestations of the disease in one or more organs, the most prevalent disturbance being lung-mischief of the type of capillary bronchitis or lobular pneumonia, occasioned by a continuing of the inflammation down along the mucous membranes of the bronchi from the trachea by direct contiguity.

In these cases, representing about 81.6 per cent. of all the fatal ones, the respiration would soon become again more frequent, severe dyspnœa would set in, the temperature would rise to 40.0°C (the highest being 41.1°C), the pulse to above 150, and, under great prostration, death would set in. Physical examination would generally reveal dulness on percussion and bronchial breathing, large bubbling and crepitant râles; the post-mortem examination confirming the diagnosis by revealing lobular infiltration, atelectasis and emphysema of parts of the lung, and not infrequently œdema.

A septic condition of the tracheotomy wound could be noticed in fourteen cases, and in four other cases an extensive affection of the skin of a diphtheritic nature was observed, spreading from the wound, and somewhat resembling septic or erysipelatous inflammation in aspect. 36.4 per cent. of all the cases showed an active participation on the part of the submaxillary lymph glands, in three of which the affection developed into extended œdema of the neck and side of the face.

In eight cases (or 9 per cent.) there was albuminuria, in some of which the microscope revealed casts, mostly narrow granulated ones, and hyaline ones beset with white blood corpuscles.

In ten cases (or 11.4 per cent.) nervous symptoms were observed, five cases exhibiting paralysis of the muscles of the pharynx, making the act of swallowing impossible; in two cases sudden death by paralysis of the heart occurred; in three cases general convulsions set in shortly before the lethal exitus.

Occasionally a septic exanthema would make its appearance upon the skin, small hæmorrhagic spots being the first signs developed. Likewise the post-mortem examinations, which could not, however, be obtained in all cases (performed by

Prof. Weigert and Dr. Huber), frequently revealed, beside the regular conditions of membranous or gangrenous diphtheria of the fauces and croup of the larynx, trachea or bronchi, purulent bronchitis and the lobular foci combined with atelectatic and emphysematous and œdematous parts already alluded to, hæmorrhages in the muscular tissue of the heart and into the pericardium and pleuræ (two cases), tumors of the kidneys (eight cases), of the spleen (seven cases), of the liver (two cases), of the folliculæ of the intestine (one case). Anæmia and fatty degeneration of the kidneys was found in two cases, and of the heart (in one case), dilatation of both ventricles of the heart (in four cases), emphysema of the pericardium (in one case).

Quite different in their general aspect from these cases of the surgical clinic, were those cases of diphtheria admitted to the medical department, and which I, some months later, had for a time the opportunity of observing under Prof. E. Wagner, the director of the hospital medical clinic. This period occurred after the severity of the epidemic had passed, and although I attended twenty-nine cases, all of which presented diphtheritic formations on the tonsils and adjacent parts, as distinct from other affections of the fauces and so-called *angina lacunaris*, only one case had to be transferred to the surgical department, and here subsequently died. All the rest recovered. Many of these cases had occurred in the same houses and families, where generally at least one member had died. The time of observation varied from six to twenty-four days. The treatment of many cases was continued through the whole time with oil of turpentine; a teaspoonful of a mixture containing a little spirit of ether being given three times a day.

In conclusion, I take this opportunity of acknowledging my indebtedness to Geheimrath Thiersch, and to thank him for his kindness in allowing me the literary use of the above cases.

CONGENITAL SACRAL CYSTS—DESCRIPTION OF A RECENT CASE, WITH REMARKS.

By GEO. R. FOWLER, M. D.,

OF BROOKLYN,

SURGEON TO ST. MARY'S GENERAL HOSPITAL.

M. B., a well-nourished female infant of two months, was brought to my clinic in February, 1884. The mother stated that the child was delivered at full term, and that she had given birth previously to a child that was healthy and well formed. A tumor in the sacral region had existed since birth, and from its constantly increasing size was giving rise evidently to some uneasiness on the part of the child from pressure.



FIG. 1. CONGENITAL SACRAL CYST.
External View. *From a Photograph.*

Upon inspecting the child a symmetrical enlargement in the sacral region and of the buttocks was seen. In the median line the skin had a bluish, thin appearance, and several flattened nodules projected from the surface; otherwise the skin had a natural appearance. A prolapsus of the rectum existed, the posterior vaginal wall was crowded forward, and the bladder was pushed upwards to such an extent as to render it difficult at times for the child to micturate.

Upon palpation the mass was found to fluctuate distinctly. The first sacral vertebra was present, but no portion of the vertebral column could be made out below this point. The tumor seemed to spring from and to fill the space normally occupied by the lower sacral vertebrae and coccyx. The crista ilii could be traced backwards, and towards the median line. Digital examination per rectum showed the latter to be crowded forward, and the same distinct fluctuation was here likewise made out. A glance at the accompanying photo-electrotype will give an accurate idea of the appearance of the growth.

During inspiration, and when the child cried, the growth became more tense; during expiration there was a perceptible relaxation of its walls. Position did not seem to influence it in any way, and no reduction in the size of the swelling took place upon pressure.

Aspiration was performed for the purpose of relieving the pressure symptoms, and at this time about an ounce and a half of fluid was withdrawn, or trickled away through the opening made by the needle. This was repeated from time to time as the sac refilled. Unhappily, through a misunderstanding, the fluid with which the cyst was originally filled, and which was withdrawn upon the occasion of the first aspiration, was lost. That removed at subsequent aspirations was found to be clear, limpid and albuminous, and contained traces of chloride of sodium. After each withdrawal of fluid the child seemed much more comfortable, and so continued until it refilled, the prolapsed rectum and projecting vaginal wall resuming their normal relations upon emptying the cyst. The nodules overlying the growth seemed cartilaginous in character, and were situated between the cyst wall and the integument.

The persistent refilling of the growth, and the evident loss of strength and tone in the child after each aspiration, finally determined me to attempt the removal of the cyst. Accordingly, on Sept. 20, the child then being nine months old, I operated as follows: Ether was administered, an incision made commencing at the lower and outer limit of the first sacral vertebra, at the point where the sacro-iliac synchondrosis could be made out; this was extended downwards, crossing to the other side at about an inch above the anal margin, and carried upwards to a point on the opposite side corresponding to the place of beginning. The semi-elliptical shaped flap thus formed was then dissected up, care being taken to include only the integument. A further examination at this time confirmed my former opinion that no communication existed between the cyst and the cavity of the spinal meninges, and I therefore proceeded to attempt the enucleation of the sac. That portion which projected under the buttocks was readily separated, but there was evidently some adhesion to the pelvic viscera. I there-

fore opened the cyst, evacuated its contents, and made further exploration with my fingers in its cavity; there escaped at this time about four ounces of fluid. Examination now revealed the entire absence of the lower sacral vertebrae and coccyx, and, furthermore, it was at once apparent that the anterior cyst wall was adherent to, or, more properly speaking, formed a part of the pelvic peritoneum. It was at once resolved to explore no further in that direction. I therefore rapidly excised the portion of the cyst wall corresponding to the flap, as well as that which lay beneath the glutei muscles, tied all bleeding vessels, irrigated with a warm Koch's solution (mercuric bichloride, 1-1000), placed two decalcified bone drains in position, brought down the flap, and closed the wound with a continuous cat-gut suture. The dressing consisted of a pad of sublimated and naphthalinated wood flour, held in position by a firm bandage.

The child survived the operation but a few hours, dying from shock, despite every effort. No post-mortem was allowed.

The following description of the portion of the cyst wall removed is furnished by Dr. Frank Ferguson, Instructor in Histology in the Long Island College Hospital:

"The portion of the congenital cystic tumor from the sacrum is irregularly spherical in shape, measures two inches in diameter, and weighs, as it was received, twenty-five grammes. It contains several cysts, some of them microscopic, and some varying in size from a pea to a horse-chestnut.

"Many of these cysts are empty, others contain brittle white masses which, under the microscope, are seen to be composed of granular material (metamorphosed epithelium) and large, ciliated, cylindrical epithelial cells. The inner surface of the cyst walls is smooth, and covered by cylindrical ciliated epithelium. These cysts are surrounded and separated by fibrous tissue, whose arrangement, in places, is that of a simple fibroma, but very generally that of a fibroma molluscum. The vascular and nervous supply is the same as in simple fibroma.

"There are numerous pigment granules seen throughout the tumor."

This case seems to be of unusual rarity, as well as interest. Perhaps the best article in the English language upon congenital sacral tumors is that contained in the fifth volume of Holmes' *System of Surgery*, where reference is made to a series of cases collected by Braune, of Leipsic, and published in his work entitled *Die Doppelbildungen und angeborenen Geschwülste der Kreuzbeingegend*. I fail to find a case identical with, or even analogous to, the one above reported there referred to. Bryant¹ speaks of cases that have been reported as "false spina bifida," and, in rare examples, believes that tumors of this

¹A Manual for the Practice of Surgery, page 195.

class are "cured cases of spina bifida, the sac of the hernia having been occluded at its neck by the natural contraction of the surrounding parts." That this could not have been true in the present instance is evident from the fact that the spinal column was perfect down to the point of its abrupt termination at the lower border of the first sacral vertebra. The case quoted by him as falling under his own observation, in which a cure followed a spontaneous rupture of the sac and escape of its contents, undoubtedly should be placed under the head of cured false spina bifida.

Ashhurst,¹ in speaking of false spina bifida, includes under that head, in addition to the case so designated by Bryant, "a congenital tumor, cystic or fatty, which originates within the spinal canal and protrudes through an aperture due to a deficiency in the vertebral laminæ;" and "a tumor containing fœtal remains," etc. The absence of the sacral vertebra in the case herewith reported will not allow of its being placed under the first of these two latter heads, and its purely cystic character and simple limpid contents take it out of the second category. Even the class of cases quoted by Ashhurst, as referred to by T. Smith, namely, "congenital cystic tumors, unconnected with the spine, but occupying the median line of the back," were evidently not of the character of the one under discussion, inasmuch as in the differential diagnosis of this class of growths, Mr. Smith points out that they "can sometimes be distinguished by feeling the line of spinous processes beneath the cyst."

Agnew,² in speaking of congenital cystic tumors at the lower extremity of the spine, is disposed to place them in the same category as Bryant, viz., cured cases of spina bifida. He speaks of them as sometimes coming out between the arches of the vertebræ, and states that "so far as the composition of their contents is concerned, it does not differ from the fluid found in hydrorachis."

Mr. Frederick Treves³ calls attention to the rarity of spina bifida occurring in the sacral region alone, and makes the

¹ *Principles and Practice of Surgery*, 2d edition, page 640.

² *Principles and Practice of Surgery*, vol. ii., page 840.

³ Malformations and Diseases of the Spine, *International Encyclopædia*, vol. iv., page 903.

statement that false spina bifida is probably the sole form of deep-seated simple cyst found in this region. He speaks of multilocular cystic growths as forming the most important series of tumors encountered in this region, and states that they usually arise from the sacrum and coccyx.

The interest in this case seems, then, to depend upon the fact that there occurred, coincidentally, an absence of the greater part of the sacrum and the entire coccyx, and a cystic growth occupying their place. The plan of treatment followed was the only one from which any hope of permanent benefit could be derived. It has been the universal tendency of operators, however, to join Sir Benjamin Brodie in the opinion that, unless the entire growth in all such and analogous cases can be extirpated, it will be worse than useless to attempt to operate at all. With this view I entirely agree, and this case offers but another example to the list of failures due to the impossibility of definitely determining beforehand the exact attachments of the growth.

The following authorities may be consulted, in addition to those already mentioned, upon the subject: Abegg, "Ueber angeborne sacral Geschwülste und über des schließener Kind," *Arch. f. Gynaek.*, Berlin, 1880, vol. xvi, pp. 475-477; Ahlfeld, "Zum Casuistik der congenitalen Neoplasm," *Arch. f. Gynaek.*, Berlin, 1880, vol. xvi, pp. 135-144; Blarlock, "Extirpation of a Congenital Sacral Tumor," *Miss. Valley Med. Monthly*, Memphis, 1882, vol. ii., pp. 317-320; Gomez, "Fibroma de la Region Sacro-coxigea," *An. de Cirurg.*, Madrid, 1882, p. 179; Rochelt, "Sacral Tumor Extirpation," *Wien Med. Presse*, 1882, vol. xxiii., p. 992; Lachaud, "Recherches sur les Tumeurs Congenitales de la Region Sacro-coccygienne," Paris, 1883; Glogner, "Ueber congenitale Sakral-tumoren," Halle, A. S., 1883; Hewett, *Med. Gazette*, London, vol. xxxiv; Behrend, *Journal f. Kinderkrankheiten*, vol. xxxi.

A CASE OF ATTEMPTED RADICAL CURE FOR
HERNIA; HÆMORRHAGE; ABDOMINAL
SECTION; DEATH ON THE FOURTH
DAY; WITH REMARKS.

By F. SWINFRED EDWARDS, F. R. C. S.,

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SURGEON TO THE WEST LONDON AND ST. PETER'S HOSPITALS.

GEORGE C., age 40, but looking some years older, was admitted into the West London Hospital on September 29, 1884. He had been to the Truss Society where he was advised to undergo an operation for the cure of his hernia, as no truss would keep the rupture back.

On admission, he was found to have a large but partially reducible scrotal hernia, with a varicocele situated in front of the rupture. On manipulating the parts a peculiar emphysematous-like crackling or crepitation, was produced, and felt by several others besides myself. The patient had suffered from rupture for two years.

On September 30, the patient being under the influence of ether, an incision about five inches long was made through skin and subcutaneous tissues. Several large varicose veins now came into view. These were ligatured above and below, and removed. The sac was found to be much thickened, and on opening it a large piece of adherent omentum was disclosed. I may mention, in passing, that this condition had been diagnosed before operation. After separating the omentum from the sac a double piece of catgut was passed through its base, and the omentum tightly tied on either side. The omentum was now cut off and the pedicle allowed to fall back into the abdominal cavity.

Now commenced the business of separating the sac from the tissues of the scrotum, a somewhat difficult task in this case, as the sac was large and the tissues somewhat adherent.

This being accomplished, I passed a kangaroo tendon round the neck, tied it as tightly as I was able, and removed the remains of the sac.

Then followed a series of disasters. The peritoneum retracted, leaving the ring of kangaroo tendon in the wound. I passed my finger into the now gaping peritoneal cavity and, after a minute or two, was

fortunate enough to catch hold, with the forceps, of the cut edge of peritoneum. It was now an easy matter, with several pairs of forceps, to pull the entire circumference of the cut edge of the peritoneum down. I had commenced to sew up the hole in the peritoneum, when it became apparent that there was some bleeding going on in the abdominal cavity, as blood, which rapidly increased in volume, was escaping through the hole I was in the act of sewing up.

It was evident that one or both of my ligatures on the omental pedicle had given way. By passing my finger into the peritoneal cavity I was unable to ascertain anything. There was only one course open, viz: to open the abdomen in order to secure the bleeding point or points.

I proceeded at once to do abdominal section through the linea alba, preferring this for several reasons to enlarging my incision in the inguinal region.

After cutting through the abdominal wall, from umbilicus to pubes, violent vomiting came on, which, in spite of the endeavors of three assistants and myself, forced most of the intestines out of the abdominal cavity. These were at once covered by a hot flannel. As the intestines brought with them the omentum it facilitated the search for the bleeding vessels, of which three were found and tied.

After struggling with the intestines for five or ten minutes we were successful in reducing them. The abdomen was then sewn up as quickly as possible, not much time being expended in mopping out the peritoneal cavity as the patient evidently would not stand much more.

We turned our attention again to the groin, sewing up the hole in the peritoneum with a continuous catgut suture, and the operation, which had lasted two hours and ten minutes, was concluded in the usual way, with this exception, that the pillars of the external ring were not brought together.

The operation was conducted under strict Listerian precautions, with exceptions to be referred to presently.

Iodoform was placed next the wounds, and, over the gauze dressings, an Esmarch bandage was applied.

The note taken on the following morning states that the patient, who had rallied from the shock of the operation, was sweating profusely and complained of pain in the abdomen. Sickness frequent. Had passed his urine under him. Irrigating apparatus with iced water applied to head. Temperature, 100° ; pulse, 100, bounding and compressible; is taking tr. opii. m. xv, four times an hour; iced soda water. Temperature, evening, 100.3° .

October 2. Copious sweating; abdomen tender and painful; sickness continues; opium by mouth not retained; hypodermic injections

of morphia instead; nutrient enemata. Temperature, 100.6°; pulse, 104, soft. Wounds dressed; no inflammation.

October 3. Vomiting continues; coffee ground in character; delirious; restless. Temperature, 100.2°; moans continually. Temperature, 97.4,° evening.

October 4. Died at 6 a.m.

At the post-mortem examination general peritonitis was found, with some blood clots in peritoneal cavity. There was also a blood clot under the iliac fascia; incisions through integument united superficially.

As much has been said and written about the radical cure for hernia by excising the sac, I have ventured to bring this case before the profession to show that the dangers of the operation are real, although fortunately such a complication as occurred in this case is not often met with. I find that a like accident happened to Mitchell Banks, which is recorded in the *Medical Times* of July 5, 1884. In this case the result was a happier one than in mine, for the patient lived and was cured of his hernia.

There are several points of interest about this case. First: The presence of a varicocele which delayed the operation considerably. Secondly: The inadaptability of kangaroo tendon, of the size ordinarily used in the ligation of arteries, on account of its thickness, for tying the neck of the sac. This material I have on two occasions used with success for bringing together the pillars of the external abdominal ring in this operation.

In this particular instance, however, it was well the kangaroo ligature did not hold, or I should not have discovered until too late that abdominal hæmorrhage was going on.

Thirdly: That although I used considerable force in tying the two catgut ligatures around the omental base, one of the twain should have given way, why, I am at a loss to say, as I have on several occasions included in the ligature a larger piece of omentum.

In future cases, where it is necessary or advisable to take away prolapsed omentum, I shall be inclined to trust to silk rather than catgut ligatures.

In mentioning these incidents of the operation, I must not forget to remark how much I regret that the hot flannel, used in a hurry for covering the intestines, had not been carbo-

lized, and that, about the same period, the spray failed for several minutes.

To these two facts I am inclined to attribute the fatal termination of the case.

This is the eighth case in which I have performed this operation; of the seven others, six of which were inguinal and one femoral, all united by first intention with the exception of my first case, in which I used silver wire for suturing the external abdominal ring. Here three suppurating tracks were left leading to the sutures; the latter, I removed three weeks after the operation. In none of these cases did the temperature rise above 100.^o

In one case, that of a lad aged 19, operated upon two months ago, a slight protrusion has returned on coughing. He is now wearing a light truss and is quite comfortable.

In conclusion, I would recommend this operation in all cases of strangulated hernia where the state of the intestine is such as to permit of its reduction, and in all cases of reducible hernia where the wearing of a truss is insufficient, or of a sufficiently strong one irksome.

By this operation the patient is placed in about the same position as he was before the occurrence of the rupture. If he was subject to hernia before the operation, he possibly will be again. Hence it is advisable, as a precautionary measure, to recommend patients to wear a light truss, at all events for a year or two, which ought not to cause any inconvenience.

TWO CASES OF MALIGNANT LYMPHOMA, WITH REMARKS.¹

By LEWIS S. PILCHER, M. D.,

OF BROOKLYN.

CASE I.—Peter H., aged thirty-seven years, a native of Sweden, cabinet-maker by occupation, of robust physique, first consulted me in the early part of November, 1880, in consequence of a large tumour occupying the right side of the neck. It had first been noticed by

¹Read before the New York Surgical Society, November 25, 1884.

him less than a year previous to this date. It had developed rapidly, and now extended from the margin of the inferior jaw downward two-thirds of the way to the clavicle, and from the mastoid process forward to the median line of the neck, being bound down by the sterno-cleido-mastoid muscle, pushing the larynx over to the left of the median line, at times producing embarrassment of respiration and difficulty in deglutition. I removed the tumor, which was composed of a series of enlarged glands, on the 13th of November. Microscopic examination, as made by Dr. N. B. Sizer, revealed simply hyperplasia of pre-existing glandular tissue. The recovery from the operation was rapid and complete, and the man returned to his vocation as before.

At the end of two years, in the autumn of 1882, he again consulted me on account of an enlargement of the inferior inguinal glands of the left side, which he believed to have been excited by the frequent pressure against the corner of his work-bench to which they were constantly subjected while he was at work. This enlargement of these glands rapidly increased, so that by the first of the year 1883 the tumor seriously interfered with his locomotion. A marked impairment of his general health had also now become evident.

On the 27th of January, 1883, I removed this inguinal tumor, including also in the enucleation one of the external iliac glands; this was easily accomplished by prolonging the incision upward and outward in a curved direction upon the abdominal wall, and incising the deeper parts as for ligation of the external iliac artery. Union by first intention was secured throughout the operative wound, but the convalescence was made more protracted by attacks of severe pain in the abdomen; these were most severe at night; were not caused by, nor accompanied with, tympanites; nevertheless, during the third week after the operation he was able to walk without fatigue or discomfort from his residence to my office, a distance of one mile. During the next three months the pain in the abdomen became more marked and continuous, requiring the daily use of morphine to render existence tolerable. A tumor could now be detected within the abdomen, situated over and to the left of the lumbar vertebræ, and evidently formed by enlarged retro-peritoneal lumbar glands.

Three months later the right inguinal glands had become so enlarged that they formed a tumor of some size. In the neck, likewise, on the side originally affected, below the mastoid process, at the angle of the jaw, and along the anterior border of the trapezius muscle, enlarged glands were visible. The patient was very desirous that these should be removed, and, at his earnest solicitation, both groups of enlarged glands were extirpated. This was done August 3, 1883. Union by first intention was secured in both localities, notwithstanding the cachectic condition of the patient.

Six weeks later a line of enlarged glands could be detected along the margin of the true pelvis on both sides. Ten days later, September 27, 1883, my last examination of him was made. His anæmia, as evidenced by pallor and increasing weakness, had become great. There was some cedema of the face, most noticeable mornings, with marked cedema of the outer side of the left thigh and of the scrotum. Examination of the urine gave negative results. There was no great appreciable enlargement of the spleen. He suffered much from abdominal pain, requiring increased amounts of morphine for its control. He walked about with difficulty. A few days later he sailed for Sweden, his native country, where, after a few weeks' longer suffering, he died from exhaustion, December 6, 1883.

From the first appreciation of any glandular enlargement to the time of death about four years elapsed. This time is divisible into three periods.

1. A period of primary localized glandular disturbance, extending over one year, and brought to an end by the first operation.

2. A period of quiescence of about two years. During this period the general health remained fair. He worked regularly at his trade and supported his family, but yet it was with more effort, and with less ability to endure than had been his former wont. There had taken place a very appreciable permanent impairment of his general strength.

3. A period of progressive anæmia, with diffuse glandular disturbance, extending through one year, and ending in death.

The chief medicinal agents that were used in the course of this case, in addition to the morphine already mentioned, were preparations of iron and of arsenic, but no advantage could be discovered to be derived from them at any time.

CASE II.—Jas. R. T., aged twelve years and a half, a bright, studious, but somewhat delicate lad, whose father had died of laryngeal and pulmonary tuberculosis, and whose maternal grandmother had died of cancer of the breast. For a number of weeks the boy had been noticed to be somewhat languid, and in his general bearing to otherwise evince depression. One of the most noticeable signs of this consisted in a stiffness of the neck with which he frequently found himself affected on rising in the morning. Following upon this history he developed a croupy cough, which was most noticeable at night. This, being considered the result merely of a passing cold, was, for a week or more, treated by confinement to the house, and by simple domestic remedies. Nevertheless, the cough became more continuous, and paroxysms of severe dyspnoea had begun to occur at intervals when I was first called to see him, on the 30th of January, 1882. His condition was then similar, in general, to that manifested in the earlier period of a severe at-

tack of catarrhal laryngitis, presenting fever, loss of voice, painful, dry, frequent, smothered cough, differing in this one respect of its muffled character from the harsher and more resonant cough of laryngitis. The breathing was somewhat labored and accelerated, with occasional exaggeration of the dyspnœa. But, in addition, the gums were swollen and spongy, and the tonsils and the submaxillary glands were enlarged. The remedies usually efficient for the relief of catarrhal laryngitis were used during the first week of my attendance without benefit, beyond the alleviation caused by opiates. Meanwhile the swelling of the gums continued to become more marked until they were above the level of the teeth, and began to break down into spots of ulceration at many points. The same ulcerative process began to manifest itself in the tonsils likewise, and the pain on swallowing and on coughing was such as to indicate that the larynx was also the subject of ulceration. The condition of the mouth and fauces was such as to make a laryngoscopic examination out of the question. Now for the first time a general enlargement of all the lymphatic glands of the neck was noticed. These enlarged glands were not tender, nor was any one gland or set of glands greatly enlarged, the size of a hazel-nut, perhaps, being about that apparently presented by these glands. The general involvement of all these glands on both sides of the neck was such as to preclude the theory that these enlargements were due to the propagation of infection from the mouth or fauces, and to awaken in my mind the conviction that they were the expression of some general blood infection. While, therefore, the local troubles of the mouth and larynx were treated by stimulating and detergent gargles, and by insufflations of iodoform, special attention was directed toward antagonizing the evident general blood dyscrasia. For this purpose iodide of iron, cod-liver oil, and alcoholic stimulants were used. No effect upon the progressive march of the disease resulted from the remedies used. The ulcers in the mouth and fauces extended; the difficulty of swallowing increased; the croupy cough persisted, and was most harassing, while the labor of respiration was always marked. The condition of the glands remained unchanged, while pallor of skin and progressive debility marked the increasing impoverishment of the blood. No examination was made as to the condition of the spleen.

By the middle of the third week of my attendance the growing failure of the child's strength had reached such a degree that the greatest apprehensions as to a speedy fatal result were unavoidable. To what extent the undermining of the general powers might be due to the prolonged, laborious respiration, and to the sufferings caused by the functional activity of the swollen and ulcerated larynx, could not be positively estimated, but, inasmuch as there was a possibility that the chief

cause of the dyspnoea might be laryngeal obstruction, and nothing but good could come from diverting the respiratory current for a time from the ulcerated larynx, this was done by tracheotomy on the seventeenth day after the lad came under my observation. The operation was attended by persistent capillary oozing from the surfaces exposed by the incisions. This was finally controlled by uniting together the edges of the tracheal incisions and the skin incision on either side by sutures, thus accomplishing continuous pressure upon the raw surfaces. Only partial relief from the dyspnoea was afforded by the operation. Though the child rallied fairly after the operation, the breathing became rapid and shallow after a few hours, and he died quietly, by asthenia, fourteen hours after the operation. No post-mortem.

It is greatly to be regretted that the light which a post-mortem examination might have shed upon this obscure case was not obtained. I have but little hesitation, however, in classing it as a case of malignant lymphoma. The effect of the tracheotomy was to demonstrate the intrathoracic location of the respiratory obstruction. The frequency with which dyspnoea and cough are produced by the pressure of enlarged thoracic glands has long been recognized. Pressure on the recurrent laryngeal nerve may also have contributed to the spasmodic croupy attacks. The date at which the bronchial and other thoracic glands may have first begun to enlarge must remain uncertain, as a variable period may have been required to enable them to reach that stage at which obstructive and irritative symptoms, alternately produced by them, declared themselves. In the history of the case it was noted that a sudden and general enlargement of the glands of the neck took place. That some enlargement of these glands had not existed prior to the date of this discovery I would not assert. The peculiarity and interest attaching to them lie in the fact that so many of them, and these so widely diffused, were all at once noticed to have become enlarged, without being either painful or tender.

The early prominence of the stomatitis in this case is of interest in connection with the statistics of Gowers, in Reynolds's "System of Medicine" (1879, vol. v, p. 329, art. "Hodgkin's Disease"), where, in analyzing a group of cases in which the first symptoms depended, not on the glandular enlargement, but on the accompanying blood state, the statement is made that in two of these stomatitis was the earliest symptom. The appearance of the swollen gums in this case was unlike anything else I have ever witnessed. They formed a dull, livid, spongy ruffle, in which the teeth were set, giving the impression to the eye of tissue having a low grade of vitality, so that the melting down at points into complete necrosis was quite in keeping.

The two cases which have been detailed present the two extremes of chronicity on the one hand, and of acuteness on the other, that may be manifested by malignant lymphoma. A period of four years is far beyond the average time which intervenes between the first glandular enlargements and the final fatal termination, while a period of but little more than four weeks is quite unparalleled by any recorded cases of which I have been able to find mention. They both, however, presented, clearly marked, these essential features: a progressive blood deterioration, advancing steadily to a fatal termination, unaffected by remedies; and diffused, non-inflammatory glandular enlargements.

The differences of the accidents of the disease in these two cases were not greater than are often seen in other diseases which are recognized as being essentially of identical nature, as, for instance, tubercular disease of bones and of the meninges of the brain.

As to the ætiology of malignant lymphoma, reflection upon the phenomena which attend its course leads one to put forth the hypothesis that the essential cause of the disease is a specific infecting micro-organism, upon the growth and activity of which the blood changes and the lymphatic glandular enlargements depend. The intensity and rapidity of development of the primary symptoms must depend on many things, and especially upon the original resisting power of the individual. Upon the special group of glands that may be first, or most largely, implicated in the localized gland-infection, will depend also many of the peculiar accidents of each case.

If, as is not impossible, each affected gland is, in turn, a new focus of active germ proliferation from which an increased dissemination of the special poisonous elements takes place, the early and repeated extirpation of the affected glands would be a rational procedure, but this only as an accessory measure to those more general germicidal or antiseptic measures that might help to purify the blood stream itself, if any such can be found.

EDITORIAL ARTICLES.

ON THE DANGERS OF MODERN OPERATIVE PROCEEDINGS FOR THE RADICAL CURE OF HERNIA.

It seems, as it were, only yesterday that operations for radical cure of hernia was regarded as almost mysterious proceedings. With their invaginations of skin and intricate manipulations of loops of wire, descriptions of them read like those of an Indian puzzle. Partly for this reason, partly because of a belief that the so-called radical "cure" was, in a large proportion of instances, neither permanent nor trustworthy; and partly because of the good old surgical rule, wise enough formerly and not entirely foolish to-day, never to cut or wound where a reasonably good alternative offered, operations for radical cure of hernia used to be practiced only by the very few, and regarded with suspicion and dislike by the many.

Several circumstances have altered this position. Antisepticism has banished from the minds of most surgeons the old, just and terrible fear of erysipelas and the other traumatic infective diseases, and with the departure of this fear has gone the dread of cutting and wounding *per se*. The progress of abdominal surgery has brought about, with reference to the peritoneum, that familiarity which breeds contempt. Lastly it has been discovered that the sac plays a most important part in the continuance of the hernia; whereas opinion formerly attributed everything to patency of the rings or to that combined with a relaxed state of the mesentery or omentum.

Thus, in the short space of two or three years, a number of surgeons in all parts of the world have commenced to put aside their habit of leaving ruptures to the truss-makers, and to operate frequently by the method of excision of the sac and ligature of its neck.

Quite enough experience has accumulated to show that this form of operation has now established itself permanently, or, at all events, to last in professional favor until a better shall have supplanted it.

But we greatly doubt whether the rapidly accumulating literature of

the subject conveys to the general reader anything like a just idea of the real and not inconsiderable dangers of the fashionable operation for the radical cure of hernia. But few operators have the honesty to relate a case like that, the story of which is so frankly told by Mr. F. S. Edwards in another page of this number of our review. We welcome it as pointing a moral. We believe that the great majority of operators of any extensive experience in this department of surgery have met with some unpleasant, dangerous, locally injurious, or even fatal, accident in connection with it. Some are perfectly frank, some devote columns to their success and suggest, rather than describe, their misfortunes by a sentence or a phrase. Some, we have good reason to believe, do a great deal of mischief without being entirely aware of it themselves, especially to the cord and testicle. Numbers of cases, although they have done well in the end, have only done so after exposure to the various dangers of prolonged suppuration.

We hope we shall not be understood to be attacking the operation itself. On the contrary, we have already signified that we regard it as one firmly established on a scientific and practical basis. But we believe that a word or two of warning to those about to undertake it will not be out of place, or, rather, is really needed.

Besides the dangers of a general surgical kind, such as that of a vitally important ligature giving way, or of septic infection, there are certain particular troubles and dangers of which the most constant and serious depend on the relations of the cord to the sac when the hernia is inguinal.

In many cases of congenital inguinal hernia such difficulties are very great. It is, doubtless, easy enough when the patient is a young child and the surgeon has done the operation several times before, to strip the vas deferens and sac apart. But the remaining constituents of the cord are, upon the whole, more likely to go with the sac than with the vas deferens to which they more correctly belong. The natural consequence is trouble with the testicle, perhaps orchitis, perhaps suppuration, or even gangrene. And every proceeding which sometimes leads to these will sometimes lead a little further, that is to say, to a fatal result. So great are these dangers that more than one surgeon recommends in certain unusually troublesome cases the simplification of

the operation by taking away testicle, cord and sac altogether. Doubtless there are testicles which are useless to their possessors, just as there certainly are testicles which are much worse than useless; but it becomes little better than a matter of mere guessing when the surgeon has to ask himself what is the value of a given gland. And it is easy to see how, in a moment of great embarrassment, the operator might fail to give the testicle he was dealing with the benefit of the doubt. Indeed it is particularly easy to estimate lightly the importance of another man's testicle. It is not merely by actual castration that the patient is liable to suffer permanently. Can there be a doubt but that the orchitis which sometimes occurs may be occasionally attended by permanent damage? This consideration is greatly intensified in importance when a double operation is done for inguinal hernia on both sides.

The remarks we have made have not referred to either Spanton's operation or to the operations by injection of fluids into the canal. But the collected experience of the former is comparatively small. It appears to frequently cause suppuration, and to be adapted only to certain classes of cases. And with regard to operations by injection, if practiced subcutaneously, as they are directed to be by their advocates, is it not simply certain that the fluids would not only often not reach the right place, but sometimes even get to very much the wrong place indeed. If what Warren says about it be correct, the operation by injection requires an amount of manipulative skill and delicate tact such as an ordinary surgeon would be too modest to credit himself with the possession of.

To sum up, our position is this:—A new field of practical surgery has been opened up, the exploration of which must yield rich results; but in it there are many pitfalls, the existence of which has scarcely been sufficiently emphasized and mapped out by enthusiastic pioneers. Let every surgeon beware of them.

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RECENT CONTRIBUTIONS TO THE SURGERY OF THE NERVES.

1. Nervendehnung, Neurektomie und Nervennaht. Von Dr. Hildebrandt. Pp. 26. Berlin: T. Fischer, 1884.
2. Select Topics in the Surgery of the Nervous System. By Roswell Park, A. M., M. D. Reprinted from the *Weekly Medical Review*, St. Louis, 1884.
3. Fall von Nervennaht bei Frischem Trauma. Von Dr. Snamensky [Moscow], *Deut. Zeitschr. f. Chirg.*, vol. xix.
4. Beitrag zur Frage der Nervennaht. Von Dr. W. Müller [Göttingen], *Ibid.*, vol. xx.
5. Sur Deux Cas de Suture Secondaire du Nerf Median, etc. Tillaux, *Gaztt. d. Hopit.*, 1884.
6. Ueber Nervennaht. A. L. Rawa, Kief, 1883, Abstract in *Centbl. f. Chirg.*, 1884.
7. Zur Lehre von der Nervennaht und der Prima Intentio Nervorum. Von Dr. H. Falkenheim, [Königsberg], *Deut. Zeitsch. f. Chirg.*, vol. xvi.
8. Kritische u. experimentelle Untersuchungen ueber die Nervennaht. etc. Von Dr. Wolberg [Warsaw], *Ibid*, vols xviii. and xix., 1883.
9. Ueber die secundäre Nervennaht. Von Dr. R. Weissenstein (*Mittheilungen aus d. chirurgischen Klinik zu Tübingen*, Hft. II), 1884.

I. NERVE STRETCHING.—I. The first part (15 pages) of Hildebrandt's contribution to Nerve Surgery is devoted to the operation of nerve stretching. The earliest cases of nerve elongation were published by Billroth and Nussbaum in 1872. H. has performed it fourteen times. Vogt collected twelve cases in 1877. Fenger and Lee, in 1881 (*Journal of Ment. and Nerv. Dis.*), brought the number up to ninety-seven. To these latter authors H. makes frequent reference. Since 1880-81 this operation has been almost epidemic.

Indications are: (a) In sensory disturbances of peripheral origin. In motor, only when combined with sensory, and demonstrably of peripheral origin. (b) In reflex epilepsy, where this arises from nerves of the extremities, trunk or head. (c) In traumatic tetanus, the sooner the better. It should be banished in central troubles, such as locomotor ataxy and shaking palsy. Strictest antisepsis, *conditio sine qua non*. The necessary instruments are: scalpel, hooked forceps, flap-retractors, director, scissors and suture material. Where nerve and sheath are adherent, stretch both; this latter is the usual practice with H. when operating on smaller nerves, such as the intercostals, and must, in fact, always occur where subcutaneous stretching is resorted

to. Stretch the nerve centrifugally and centripetally¹ with thumb and forefinger, yet, if possible, without raising it out of the wound, since in one of his cases the air thus aspirated into the tissues seemed to be the cause of an acute purulent œdema.

As a measure of the proper amount of elongation, the stretched portion should, when let loose, appear tortuous; if not, then stretch until it does. His principal attention is directed to the place where the nerve should be stretched. The more central this, the greater prospect of success. He gives full-page lithographic illustrations of how to reach each of the following nerves: infraorbital, inframaxillary (trephining for neurectomy), facial, lingual, brachial plexus and phrenic, cervical nerves (accessory, large auricular, cervical plexus, etc.), crural, sciatic and tibial, or rather popliteal. He says the supraorbital has been stretched seven times for neuralgia, with four successes. Fowler (*Medical Record*, N. Y., Oct. 4, 1884) reports a case with no return at the end of six months.

H. evidently does not attempt more than an illustrative collection of cases. He speaks of six patients in whom the facial was stretched for spasmodic tic, with success, though each time there followed a paresis of longer or shorter duration.

He finds that the brachial plexus has been stretched twelve times—twice by himself. The nine for neuralgia and painful contraction gave seven cures as regards pain, his two included.

In case of a workman, who experienced severe lancinating pain in the right hypochondrium after any hard exercise, and where gallstone colic had repeatedly been diagnosticated, he stretched the first and third abdominal nerves where they emerge from under the serratus anticus major, but with only temporary success. He then elongated the eighth and ninth intercostal in the back, with immediate relief and no relapse during the two years. Though he has twice elongated the sciatic in locomotor ataxy, he now heartily condemns this practice. He

¹Stintzing (*Ueber Nervendehnung*, Leipzig, 1883) concluded from experiments on animals that stretching a healthy mixed nerve has a paralyzing action, in general proportional to the power expended. This has about the same effect on motor, sensory and trophic respiratory vasomotor nerve activity. When powerfully stretched, the nerve-lesion itself is the prominent result. When stretched more easily, centrifugal and centripetal present only a quantitative difference, the former producing more paralysis, the latter having greater transmedullary effect.

has also made a trial of it in sciatica, a relapse and later cure, whether wholly owing to the operation is not clear. By stretching the popliteal, H. permanently cured a severe and obstinate sciatica. A corresponding operation for reflex-epilepsy from the foot was unsuccessful.

In addition to the above, H. quotes a goodly number of cases illustrating the effects of this procedure on nearly all the nerves which have so far been treated in this way.

2. Park records five new cases of nerve-elongation: I. Chronic sciatica in a man of twenty-five years. Two and one-half months later there had been no relapse. II. Toy-pistol tetanus. Elongation of brachial plexus. Only temporary amelioration. III. Motor paralysis of right leg, following spinal meningitis. Stretching of sciatic. Very slight improvement. IV. and V. were on the same person. Paræsthesia, etc. Elongation of sciatic and later of crural. No result.

II. NEUROTOMY AND NEURECTOMY.—Hildebrandt devotes half-a-dozen pages to these. Neurectomy, although much the older operation, is rarely performed without co-incident stretching. The same indications apply to both, except that nerve-cutting operations are limited to the head and trunk, and only in tetanus are they permissible on nerves of the extremities. Neurotomy, or simple section of a nerve, is now abandoned, or rather superseded by the other operations. H. does not touch on neurotomy of the optic, which attracted so much attention from ophthalmologists not long ago. In practice, we should first make use of internal and external remedies; if these fail, then stretch the nerve, and only when this does not succeed, and the case is desperate, should excision, with stretching of the central portion, be resorted to. H. last year resected the infraorbital, and, later, inframaxillary, with relief to date. Deductions from statistics have varied greatly as to the value of neurectomy. Moreover, those from operations before the introduction of antiseptics are now nearly worthless. It has never been considered a strictly curative procedure, but simply a relief from the pain (*i. e.*, in neuralgias). That it is thus valuable, H. says there can be no doubt.

III. NERVE SUTURE. As one of these writers remarks, this operation is just now one of the topics of the day, although it has not been practiced much in the United States. No American case is included in

the lists so far collected, and, although advocated by Gross in the first edition of his surgery, 1859, and discussed by Wier-Mitchell in the second edition of his work on Nerve Injuries, 1872, only the two cases of Park seem to have been reported here.

The twenty years that have passed since its first success have brought out quite a literature. Within the last few years the published cases have greatly increased, partly owing to the greater confidence in operating under the antiseptic method. In 1876, Lemke collected sixteen cases; Falkenheim, in 1881, brought the number up to thirty-nine, with four more in an added note; Tillmanns, about the same time, gave forty-three; Wolberg, in 1883, has forty-eight, and Weissenstein, in 1884, counts seventy-six. To these can be added two from Park, two from Müller, and two from Tillaux, making a total of eighty-two.

More recently yet than these, Banks, of Liverpool, has reported another case, one of the nerves of the arm; and Lobker (*Centbl. für Chirg.*, Déc. 13, 1884) gives a case of suture of both ulnar and median, and refers to a second, very similar unpublished case of his. As he says, the operation is now so generally accepted that many cases go unreported.

We may remark that it is customary to divide these cases into two classes: primary sutures, where the nerve-ends are tied together directly after the injury, and secondary, in which between receipt of the nerve-injury and suture more or less time has elapsed. When the suture is passed through the trunk of the nerve it is called direct, when only the sheath of one nerve-end is stitched to that of the other, it is called paraneurotic. Tillmanns favors combining the two. While the operation has now a fully justified position, and its indications are fairly clear, there are still some much disputed points of theory. Many of the experiments bearing on the subject have been made, as much from physiological as from clinical interest.

1. Hildebrandt's little work contains nothing new under this heading. He accepts the conclusions of Wolberg (*v. below*), and also quotes Kraussold's third case as one of primary nerve union.

2. Park, besides a partial review of the subject, gives two new cases.

- a. In 1881, he had excised the hip-joint in a boy of eleven years.

Disease of the pelvic bones necessitated a further operation in 1883. While dissecting a flap from the indurated sheath of the sciatic, the patient recovered so far from the chloroform as to make a violent twist, and thereby completely rupture the sciatic nerve. The operation was proceeded with, the nerve-ends trimmed even and united by direct catgut sutures; strict antisepsis. Absolute paralysis of sensation and motion for about a week, when sensation began to return. Thirteen days after the operation there was still a small area near the external malleolus, which was not as sensitive as usual, while he could move his leg as well as before the operation. "Judging from his progress, regeneration must have been practically complete within a fortnight."

This case deserves a fuller description, since there is but one other on record (Kraussold's third), which can compare with it in rapidity of recovery, and such cases are eagerly sought by the advocates of a healing of nerves by first intention. It is the first primary suture of the sciatic, two secondaries having preceded it.

b. The radial nerve and artery, and the tendons of the *exten. os. met. poll.* and *ext. primi internod. poll.* had been severed. The tendons were united with catgut, and the nerve with a single suture (direct?) fifteen days after injury. Gradual, almost perfect recovery. He uses flat needles, as did Falkenheim and Wolberg in their experiments.

3. Snamensky's case, operated by Sklifacowski, is included in Weissenstein's list. Median nerve and several muscles were severed. Primary suture; Lister. Good recovery.

4. Müller reports two secondaries from the year 1881. The first was on the radial, eight weeks after injury. Sensibility nearly restored at end of six weeks. Paralysis began to improve at end of six months. After a year the hand could be used, and after three years its strength was nearly normal. In the second, also on the radial, the nerve was sewed three months after injury. Sensation had been little affected. The first five months saw no improvement in the paralysis; some was found after fifteen months; recovery in two and a half years.

5. Tillaux sewed the median four months after injury. Improvement in sensation within two to three days; entire restoration of sensibility and motility at end of six weeks. In another case, a woman of twenty-eight years, he united the median fourteen years after injury, with

a good result. This is the oldest case of paralysis, from nerve traumatism, which has thus been cured. It shows that the duration of such paralysis cannot constitute a contra-indication.

IV. METHODS OF HOLDING THE TWO NERVE-ENDS TOGETHER, other than by direct and paraneurotic sutures, have occasionally been tried.

6. Rawa has lately published the results of over a hundred experiments on animals, with so-called ligatures. The nerve-ends were made to lap, or were placed side by side, and then held together by a ligature around both. The cut surfaces not being in contact, anything approaching a healing by first intention is of course out of the question. At the end of six to twenty months he found that physiological union had taken place.

He pretends to believe that this method would succeed where the tension is too great for the ordinary sutures, as after loss of some of the nerve trunk, or the peripheral end of one nerve might thus be tied to the central of another where both could not be united entire. Létievant proposed suturing the two under such circumstances, where they are partly or wholly alike in function.

7. Falkenheim, in an article of seventy-three pages, gives a fairly exhaustive account of the subject of nerve-suture and of union of nerves by first intention, and perhaps the most critical one in our list. He adds no new case, but sifts those of others the more thoroughly. First, he reviews the experimental work on this question, dating back a hundred years, and appends some carefully executed experiments of his own. His main attention is directed to the much contested question of primary nerve union. Considerable space is devoted to supplementary motility and sensibility,¹ an understanding of which is necessary in deciding on the possibility of said primary union. He holds with Létievant, that motor paralysis from severance of a nerve may appear much improved through the vicarious action of complementary and remaining muscles supplied by other nerves. The remaining, though altered, sensibility in a part after section of its sensory nerves depends on two things, one is the existence of nerve-anastomoses which act directly. The pain caused by cutting a peripheral nerve

¹The question of supplementary sensation is treated of in a long article, by a writer in the first two numbers of *Arch. of Psychiatr.*, 1884.

stump, as in the cases of Richet and Schuh, may be cited; this depends on so-called recurrent nerve fibers, which are much more abundant toward the periphery. The other factor in supplementary sensation is the transmission of the impulse, through the intermediate tissues to papillæ in districts adjoining that of the paralyzed nerve. This latter is only possible for one sensation, that of touch, though, if care be not taken, heat may also be perceived from its radiation to normal parts.

He gives brief abstracts of the thirty-nine cases collected (four are added in foot-notes), and points out how deficient in detail are most of the published descriptions. Cases of secondary suture are far more conclusive in discussing supplementary functions than primaries, since the former admit of careful examination before and after operating, and include no wounds of other parts. There is, moreover, less liability to error after injury of the radial than of the ulnar or median, since the functions of the muscles, supplied by the radial, cannot well be replaced by other parts. He approves a saying of Létievant: "*Ce ne sont ni les mouvements ni les usages de la main qu'il font interroger, mais les muscles.*" He claims that the microscope alone can decide positively as to primary nerve-union; and, since, clinically, we shall rarely have an opportunity for such examination, we must have recourse to experiment. He worked mostly on the sciatic and vagus nerves in rabbits. To prove the result, after a suitable interval of seven to fourteen days, he laid the operated nerve bare and tested by stimulating both mechanically and with the faradic current, first peripherally, and again, the free end of the nerve, after section above the cicatrix. To determine any return of sensation he measured in some of the animals the reflex increase in blood-pressure from irritation of sensory nerves. All these tests gave a negative result. In case of the sutured vagus he could get no effect on the myosis or the heart action. He shows that rabbits, especially young ones, after injury of the sciatic, regain somewhat the use of their paws by learning to use certain accessory muscles. He acknowledges that one positive result would overbalance all his negative ones; and, considering the results obtained by Gluck, he grants the possibility of primary nerve union. His microscopical examinations proved likewise negative.

Falkenheim experienced no harm from either direct or indirect su-

tures, but concludes from statistics that, clinically, the indirect is preferable. Where, however, the paraneurotic tissue has been destroyed, or where there will be considerable tension, the direct suture is in order.

8. Wolberg goes over much the same ground as Falkenheim. Is nerve-suture a useful operation? how is it to be done? is a *prima intentio nervorum* possible? does the axis-cylinder of the peripheral nerve-portion perish with the degeneration of the latter? what elements serve in forming the new nerve-fiber? are questions which he proposes to himself.

The first part of his work, in vol. xviii, covers seventy-two pages, and treats of the clinical and corresponding statistical side of the subject. The second, vol. xix, thirty-six pages, details experiments on animals, and closes with nearly six pages of closely printed bibliography.

For convenience, he starts on the basis of Falkenheim's and Tillmann's articles, completing them with other cases, including an entirely new one (Jefremowski's). Severed nerves may heal spontaneously, as seen after operations for neuralgia. This "independent regeneration" usually takes much longer than when a cure is effected by suturing. He notes that when a mixed nerve—and only on such has nerve suture as yet been practiced—is completely severed, the sensibility, motility, nutrition, excretions and temperature of the corresponding parts suffer change. The disturbance in nutrition may be not only genuine trophic, but also atrophic, from inactivity. The peripheral anastomoses, he concludes, consist only of sensory fibers, and have, therefore, nothing to do with Létievant's supplementary motility, but only with supplementary sensation.

According to Falkenheim, transplantation of a portion of one nerve (lingual) into the trunk of another (hypoglossus) in a dog was successfully accomplished by Philipeaux and Vulpian (1863). They experimented to show nerve conductivity in both directions. Gluck published, in 1880, experiments in transplanting pieces of nerve with a view to determining its practical, surgical value. Albert in 1876 (details first published in Wolberg's article) excised a tumor of the median nerve, leaving a small bridge of nerve-fibers, and immediately transplanted a piece of the peroneal nerve from a fresh amputation. The wound healed *per primam*, but the paralysis was not averted. It would

appear that it was last examined ten days after the operation; but since primary nerve-union is held to be essential in transplantation, this is reckoned a failure. This was the only case where this had been known to have been tried in man, until the recent report by P. Vogt of a case in which twelve centimetres from the two *nervi ischiadici* of a dog were transplanted to supply a defect in the musculo-spiral nerve of a man, one and a quarter years after the injury. They healed in, but nerve function was not regained.

While Falkenheim concludes—as most authorities before him have done—that a *prima intentio nervorum* is very improbable, Wolberg argues just as earnestly that such a result is not only possible, but has repeatedly been attained. With admirable naiveté, the same cases, if not exactly used by each to prove his own view, are at least shown to be entirely in harmony with it. Which, then, shall we accept? While this question can not now be definitely answered, it is noticable that their apparently different conclusions are, in part, only technically so. Under the term *prima intentio* Wolberg understands a speedy union of central and peripheral nerve-fibers, with restoration of all normal functions. This union may occur in one of two ways: First. Immediate primary intention, where the cut surfaces of corresponding fibers in the two ends are in contact, and axis-cylinder and Swann's sheath unite directly. Here the nerve conductivity returns in a few days. Second. Mediate primary intention, where the microscopic distance between both sewed ends is filled in by new formed short nerve-fibers uniting the two. Since these are new formed the process might be termed a regeneration; still, it differs from actual regeneration in that there is no previous degeneration of the peripheral end, and restitution occurs in a short space of time. He thinks probable that in a given case both forms of primary union may occur, side by side.

It is noted by most observers that where suture is successful sensation returns before motility. Wolberg attempts to explain this by the degenerated and atrophied condition of the muscle, and believes that the motor nerve fibers are in reality restored as soon as the sensory, citing in addition a case of Langenbeck's, where motion returned long before sensation (operated eighty days after injury). His explanation, in its present form, can, however, be allowed only a very limited appli-

cation. We have simply to recall the cases of slight nerve injury and those others where, from cold or other unknown influences affecting a nerve trunk, a sudden and more or less complete peripheral paralysis results, with no, or no corresponding, loss of sensation. Here there can certainly be no muscular atrophy to account for it.

In the experimental part Wolberg touches on a number of disputed points, and which should be read in the original by those particularly interested in the theoretical side of the question. He experimented on dogs and hens to the number of thirty, though seven of these were spoiled; one was on the vagus, the others were on the sciatic.

He decides with those who claim that the whole peripheral nerve after injury degenerates equally fast, although this may be more rapid just at the cut end, owing to the direct influence of the trauma (others say it proceeds centripetally, and still others centrifugally). Paralytic degeneration is the unavoidable consequence of separation of a nerve from its center; inflammatory, on the other hand, depends on the injury received; the course of the former is always constant, that of the latter very variable. The processes of nerve degeneration are not intelligible as yet. Disintegration of the nerve medulla he never found as early as twenty-four hours after section, though always by forty-four hours. *The axis-cylinder does not participate in the degeneration.* This structure he found, e. g., where a cat was killed fifty-one days after removal of a portion of the sciatic. The nerve medulla of the remaining peripheral portion had been absorbed, but the axis-cylinders were intact. Same in another case after ninety-eight days. Their durability is of great importance. He quotes Schiff: "The axis-cylinder belongs to the most resistant tissues of our organism." How long these remain W. acknowledges is an open question, though he holds that this explains the successes in nerve-suture months and years after injury. He is not by any means the first to combat Waller's theory, that after section of a nerve its peripheral portion degenerates to a strand of connective tissue.

In all his experiments he secured but one beginning primary nerve union. This animal was killed at the end of ninety-four hours, having meanwhile given some evidence of recovery of the use of the nerve; entire absence of all appearances of degeneration in both

nerve stumps. He is of the belief that the regenerative cells, from which young nerve fibers develop, originate in the cells of the surrounding perineurium. Regeneration, according to his view, proceeds in a centrifugal direction; its speed depends on many factors, is far more rapid in birds than in mammals; in spring and summer, than in fall and winter frogs; faster in young animals than in old ones; in slight than in severe nerve wounds, etc. In man, the influence of age can not yet be determined, since the observations are still too few. Direct and paraneurotic suture appear to exert the same influence on the duration of regeneration. He prefers direct suturing, in contrast to Falkenheim, since this admits better coaptation of the two ends, and where the nerves are small, is the only feasible method. Nerve-suture exerts a peculiarly beneficial influence in preventing trophic changes, which usually take a longer time to develop.

He intimates that where wire has been used instead of catgut, we may get a deceptive electric reaction soon after operating. The granulation tissue uniting the stumps is also capable, even during the first few days, of conducting the current. It cannot, however, conduct impulses either centripetal (sensory) or centrifugal (volitional). So says Wolberg, but his conclusions and deductions are not all of them proven, and have not gone unchallenged.

9. Weissenstein is the latest compiler, adding two new cases. The number is now becoming so large, that the division into primaries and secondaries can be better carried out. W. gives a table of those nerve-sutures not found in Wolberg's article—twenty-eight not included in the previous lists—thus bringing the total number up to seventy-six. He limits his discussion to secondary sutures, giving his two new cases, operated by P. Bruns, in full, and adding abstracts from the thirty-one others, a total of thirty-three secondaries. The two new ones were, after accidents to the radial, one operated seven weeks, the other four months after injury. The first was completely cured, though this took a year; the other patient was, six months after operating, fast regaining the use of his hand. In the second case, microscopical examination (by Ziegler) of the removed peripheral stump did not reveal any semblance of axis-cylinders.

The following statistics are based on Weissenstein's, corrected by ad-

dition of the six new cases above. To W.'s thirty-three add Park's second, Tillaux's two, and Müller's two, making a total of thirty-eight secondaries: thirteen on radial, nine on median, nine on ulnar, two on both ulnar and median, one radial and median, one median, ulnar and cutan. maj., one branch of radial, and two on sciatic. In reality forty-three secondaries in thirty-eight patients. The Germans include, as here, the musculo-spiral under the radial. The time between injury and operation varied from twelve days to fourteen years. Approximate cures have been effected after sixteen months (Esmarch, radial, improvement at end of five months, practically complete restitution at end of three years); after three years (Jessop, ulnar, hand could be used after eight or nine months), and after fourteen years (Tillaux, median, gradual and permanent restoration). Langenbeck produced improvement by suturing the sciatic two and a half years after injury. In three, the result is unknown, or time of observation yet too short, leaving thirty-five. Of these, twenty-five, or seventy-one per cent, were nearly or completely cured, four were somewhat improved, while but six, or seventeen per cent., were total failures. The duration of cure in these secondaries is often one to two years. Determination of the return of sensibility is somewhat uncertain. Motility in one returned slightly on sixteenth day (Langenbeck's case, operated eleven weeks after injury), in three others on twentieth day, and in two about the twenty-fifth day. After-treatment is very important, electricity (both currents have been recommended), methodic gymnastics, and massage should be persevered in for a long time. He very naturally concludes that secondary suture is indicated even in old cases, where there is any material functional disturbance.

There are forty-three primaries recorded (of one other it is unknown), of these, the result is not stated in two, leaving forty-one, amongst which were twenty-six successes, or sixty-three per cent. In fifteen, or 36.6 per cent., there was little or no improvement. Primaries and secondaries together give: thirty-eight on ulnar, thirty-seven on median, nineteen on radial, two on cutan. brach. ext., one on cut. brach. int., three on sciatic, one on peroneus. These include fourteen cases where more than one nerve was sewed: nine ulnar and median, two ulnar, median, and radial, one median, cutan. ext. and int., one median, ulnar, and cutan. ext.

Of these, it is known that in thirty-two, direct suture was applied, and in eighteen indirect. Amongst seventy-nine cases, fifty-five, or 69.6 per cent., were fair successes. In the remaining twenty-four, little or no improvement had been observed up to date of their dismissal.

These statistics are, however, at best, but rough approximations. In many cases the exact amount of success does not seem to have been determined, or proper allowance has not been made for supplementary functions; in many cases complications rendering suture of tendons, etc., necessary make the result indefinite, and finally, many of the cases have not been followed up long enough to really determine whether a cure will result.

In neither primary nor secondary can we guarantee a cure. Where the nerve-ends in primary suture are badly bruised, it has long been recommended to first cut off the contused portion before tying. Always immobilize in position of least tension. Catgut has been mostly used, and is now recommended by all; where paraneurotic, place about three sutures at equal distances on the periphery. Hulke and v. Langenbeck operated, after constricting the arm, with Esmarch's bandage; good result in both.

No dangerous consequences, or even harm, has followed nerve-suture.

WM. BROWNING.

TRACHEOTOMY IN LARYNGEAL STENOSIS OF TUBERCULOUS ORIGIN.

By the works of Dubois,¹ Gouguenheim² and Balzer,³ Baréty⁴ and Sestier,⁵ considerable light has been thrown upon the subject of œdema of

¹*Arch. de Phys.*, 1878.

²De l'œdème des Replis Arytено-Epiglottiques surtout dans les Maladies Chroniques du Larynx. *Annales des Mal. de l'Oreille et du Larynx*, 1883., t. ix., p. 126.

Des Indications de la Trachéotomie dans la Tuberculose Laryngienne. Note read at the Congrès au Rouen (1883), and published in *Ann. des Mal. de l'Oreille*, etc., t. ix., p. 249.

De l'Adenopathie Trachéo-laryngienne, *Gazette Hebdomadaire*, 9 Sept., 1881.

Etude Anatomique et Pathologique des Ganglions Peritrachés Bronchiques et Laryngiennes. *Acad. de Med.*, 20 Fev., 1884.

³In *Arch. de Phys.*, Dec., 1882.

⁴De l'Adenopathie Trachéo-bronchique en Général et en Particulier dans la Scrofule et la Phthisie Pulmonaire. *These de Paris*, 1874.

⁵Traité de l'Angine Laryngée Œdémateuse, Paris, 1852.

the glottis and laryngeal stenosis in the phthisical, which has been made the subject of a careful study in a recent Thesis, by Dr. Louis Gregoire.¹ Chiefly upon the facts collected in this thesis has been based the following study:

Oedema of the glottis has been long regarded as one of the most frequent complications of laryngeal phthisis, and as the chief cause of respiratory troubles in that disease, and it is only of late that it has been discovered that oedematous infiltration is not so frequent a complication of the complex changes developed in the larynx by the tuberculous diathesis, and that, in consequence, tracheotomy is not so frequently indicated in laryngeal phthisis. The pathological product, in fact, consists of tuberculous infiltration which has no tendency to retrogression, but, in its slow advance, might require tracheotomy at any moment.

While the laryngeal lesions developed by chronic phthisis are more frequent, and more often indicate tracheotomy, acute phthisis may develop lesions which may lead rapidly to attacks of suffocation. In a case observed at the Hospital Bichat, by Gouguenheim, the arytenoid cartilages were invaded by a caries so rapid as to bring on, in a short time, oedema of the aryteno-epiglottic folds, and ulceration of the laryngeal mucous membrane; and an arytenoid cartilage was found at the autopsy to be on the point of dropping into the cavity of the larynx. It is in acute phthisis particularly that this accident is to be feared, lesion of the arytenoids being characteristic of the acute, while that of the cricoid and thyroid is noticeable in the chronic form. The lesions which require tracheotomy, as has been remarked, are more numerous in chronic than in acute phthisis. Necrosis and caries of the cartilages cause frequent attacks of suffocation, and the demand for operative interference in these cases is so sudden as to require the utmost expedition to save life, which, however, may be greatly prolonged by prompt intervention.

Submucous infiltration may contract the caliber of the larynx; loose masses of mucus, thickened, hardened, and budding like actual vegetable growths may interfere more or less with the glottis; and there are polypoid excrescences, morbid growths, which impede, to a greater or less degree, the various functions of the larynx. These tumors, slow

¹ Contribution a l'Etude de la Trachéotomie chez les Tuberculeux. *Thèse de Paris*, 1884, No. 214.

tuberculous infiltrations, may involve a part, or the whole, laryngeal cavity, and mask the vocal chords, so that they cannot be examined laryngoscopically. They are frequently unaccompanied by any pulmonary disease, and an operation may prolong life for years. These tumors may exist co-incidentally with tuberculous infiltration of the aryteno-epiglottic folds, but sometimes they are independent. If attacks of dyspnœa occur, when these two lesions exist simultaneously, they are not due to the enlargement of the aryteno-epiglottic folds, and the classic *œdema glottidis*, has been demonstrated laryngoscopically, in cachectic patients, in whom dyspnœa and dysphagia were entirely absent. Gouguenheim has reported three cases of œdema of the glottis, in which absolutely no dyspnœa was present. In two of these, paralysis of the vocal chords in the cadaveric position was present—a symptom of change affecting the arytenoid cartilages, and analogous to that which occurs when the two recurrensts are cut or compressed. Attacks of suffocation, then, are not constant in œdematous laryngitis, and it has been observed¹ that it is impossible to establish any clear connection between the existence of œdematous angina and the presence or absence of suffocation. As the results of the laryngoscopic examination of a large number of cases of laryngeal phthisis, Gouguenheim concludes:

1. That the œdematous folds separate during inspiration, as do the vocal chords during respiration in the physiological condition.
2. That when the patient is bidden to utter a sound, the swollen folds approach one another, but without inducing dyspnœa, and that it is only when this act is prolonged that spasm, and consequent dyspnœa, is produced.
3. That when the folds are so greatly enlarged as to be completely in contact, they preserve almost entire immobility, and inspiration develops no dyspnœa; but emission of sound and a prolonged laryngoscopic examination very quickly produce spasm and dyspnœa, without, however, visibly changing or displacing the folds.
4. That in course of a very pronounced case of œdema of the glottis, laryngoscopic examination at the instant of a paroxysm has shown that, far from meeting at the moment of inspiration, the folds separate

¹ *Peter & Krishaber, Dict. Encycl. des Sc. Med.* 2 series, t. 1., pp. 6, 17, Art. Larynx.

a little, the suffocation and dyspnoea not being due to the mechanical meeting of the swollen folds.

Haste in performing tracheotomy is not necessary when laryngoscopic examination has discovered swelling of the epiglottic folds, unless this condition is accompanied by laryngeal dyspnoea and an attack of suffocation, with sharp and whistling respiration; nor even when the swelling invades the larynx itself and extends below the vocal chords, which exists, according to Sestier, in two-thirds of the cases, and ordinarily results from a necrosis of the cartilages, especially of the cricoid; the vocal chords become smaller but moveable, and there is an actual œdema of the lips of the glottis. In these cases the danger proceeds from progressive and irremediable stenosis of the glottis; patients are subject to intense dyspnoea; attacks of suffocation may arise, and asphyxia may supervene very quickly if an entrance for the air into the trachea has not been provided. Tracheotomy is equally required if an acute catarrhal laryngitis comes to complicate one of the severe forms of tuberculous laryngitis, exciting great tumefaction.

A lesion of the vocal chords, more serious still than the preceding and which almost always requires tracheotomy, consists in the immobilization and meeting of the vocal chords, due, according to some authors, to paralysis of the dilators, and, according to others, to contraction of the adductors. In Germany the diagnosis of paralysis of the posterior crico-arytenoid muscles has long been insisted upon and clearly demonstrated in those cases which are quite generally considered to be *œdema glottidis*. This neurosis is caused, either by a change in the nerve-filaments so numerous in the sub-mucous tissues of that region, by compression of the recurrent nerves by greatly enlarged glands, or by necrosed cartilages. The changes in the nerves of the larynx constitute an actual tuberculous perineuritis, consisting, according to Gouguenheim and Balzer, of more or less considerable granulations, which ensheath and compress them, more or less interfering with their nutrition. The neurilemma of the more important nerves has been seen to be thickened and sclerosed, and even invaded in its whole extent by embryo cells. When compression of the recurrents takes place at the larynx, it is due to hypertrophy of the small glands which lie in the space included between the larynx, the trachea and the œsophagus, or it may be situated much lower.

The pneumogastric and diaphragmatic nerves are also liable to suffer the compressive action of adjacent enlarged or diseased glands. Whenever compression of the recurrent or pneumogastric nerves occurs adjacent to the larynx or the thorax, it produces paralysis or contracture of the vocal chords, and tracheotomy is demanded at once.

Tracheotomy may be required in laryngeal phthisis by the sudden entry into the larynx of abundant or inspissated mucus; in this case it is only palliative, for the patient must soon succumb to the pulmonary lesions. When the epiglottis is ulcerated, so that it is immovable or assumes a vicious position, deglutition is impeded and painful, and morsels of food, penetrating the larynx, may produce symptoms demanding operative interference; in this, as in the preceding case, the operation cannot much prolong life.

There are other causes of dyspnœa which arise in tuberculosis which seem to require tracheotomy, without appreciable lesion of the larynx, the source of the trouble lying in the cervical portion of the spinal cord and the medulla. Dyspnœa and suffocation may also be caused by enlargement of the tracheo-bronchial glands, which compress the air-passages below the larynx. In these important and not infrequent cases, unless the glandular hypertrophy lies very high up, tracheotomy is unavailing.

With regard to the propriety of operating in tuberculous stenosis of the larynx, it cannot be disputed where the larynx is the sole seat of the disease, nor can its advisability be urged where the stenosis is the last manifestation of a prolonged and enfeebling disease. In other cases, when there is a prospect of giving relief, be it ever so temporary, the operation should be performed, since in itself it can not hasten the death of the patient.

Before operating, it is important to be assured (1) that the obstacle to the passage of air lies in the accessible portion of the respiratory tract, and (2) that it lies there only. The diagnosis should be verified not only by functional signs, such as the voice, respiration, cough, etc., but by physical signs obtained by inspection of the throat and neck, by digital examination, and particularly by laryngoscopic examination. Digital examination is far more accurate than simple inspection; by it can be learned whether the epiglottis is swollen and deformed, if one or

both of the aryteno-epiglottic folds are affected, and it is of great service where the patient is prostrated or comatose. This method of examination, while it may be of great service, can not be depended upon since it may induce an attack of suffocation, and in some patients it can not be used at all. The laryngeal mirror is of great use, though it can not clear up the diagnosis in all cases. It is only rarely that the presence of intra-laryngeal trouble can be positively decided. Sestier believes the following to be distinctive signs: if œdema of the glottis and intra-laryngeal œdema co-exist, there is no marked contrast between the difficulty of inspiration and the ease of expiration; expiration is quiet, or almost as obstructed as inspiration, and tracheotomy is more apt to be necessary.

The diagnosis between œdema of the glottis and constriction from enlarged tracheo-bronchial glands is often difficult. The laryngoscope study of previous symptoms and careful exploration of the chest would be of value. The laryngeal and tracheo-bronchial glands should be examined, since, by pressure upon the nerves as well as upon the air-passages themselves, they may produce dyspnoea.

The differential diagnosis should be made from foreign bodies, aneurisms of the aorta, croup, with all varieties of chronic laryngitis, the catarrhal, the hypertrophic, or the glandular, polypi of the larynx and syphilitic laryngitis. Laryngeal examination only can furnish a diagnosis in these cases. It is particularly important that the diagnosis of syphilitic laryngitis be made, even though tuberculosis should co-exist, for the trouble may disappear like magic under proper specific treatment.

In cases of paralysis of the dilator muscles of the glottis, or the tensor muscles of the vocal chords, the results of electricity are valuable assistants to diagnosis.

The operation should not be delayed too long, but when intense dyspnoea shall have arisen, or when a very violent attack of suffocation has appeared, or even when a slightly severe attack has followed upon another, the surgeon should not hesitate long, because the strength of the patient, constantly weakened by his efforts at respiration, the paroxysms of suffocation, and the condition of his blood filled with excretory products which can not be replaced by oxygen, can not hold out long.

Should the operation be delayed until asphyxia occurs, the patient is apt to succumb because of inability to recover from the extreme prostration, caused by insufficient oxygenation of the blood. The more a patient has been affected by pulmonary disease the more should the operation be hastened, if symptoms of suffocation occur. Still tracheotomy should not fail to be performed at any stage of asphyxia, for life may be saved at the latest stage. After a severe attack of suffocation, patients often fall into an apparently calm repose, by which the surgeon should not be deceived, for it is the immediate precursor of death, caused by the condition of asphyxia, and demands prompt operative interference.

With regard to the selection of operative procedures, *sub-hyoid laryngotomy* is not available, because the obstruction usually lies below this point. *Laryngotomy* proper should be rejected: (a) because penetrating wounds of the thyroid, unless made precisely in the mesial line, produce lesions of the vocal chords; (b) because wounds of the laryngeal cartilages (and this applies as well to the cricoid) may cause rapid development of perichondritis and consecutive caries, if this lesion had not previously existed; (c) because these cartilages are not infrequently ossified in individuals attacked with laryngeal phthisis, and this is the source of great difficulty in section of the cartilage, and later in cicatrization of the wound; (d) because greater care is required in introducing the canula, and keeping it in place, than when the trachea is opened; (e) because the incision through and the pressure exerted by the canula upon the laryngeal mucous membrane may augment the intensity of the disease, and irritate the mucous membrane to such an extent as to induce intra-laryngeal oedema, if it did not exist before the operation; in the later case, the oedematous mucous membrane might protrude and obstruct the lumen of the air-passage below the canula.

Cricotomy should be avoided, since the cricoid ring is, in consumptives, very often ossified, and an attempt to separate the ring in front will fracture it behind. At other times the canula may be pressed back by the elasticity of the cartilage and, as in a case reported by Verneuil, induce ulceration completely through the back of the trachea. *Inter-crico-thyroid laryngotomy* is an operation equally objectionable in laryngeal phthisis, and the same may be said of *crico-tracheotomy*.

We are, then, led to *tracheotomy*, and to a decision between the high and low operation. Either of these operations is more difficult than the preceding, on account of the greater thickness of tissues to be divided, and the veins and arteries to be avoided; but the incision of the rings of the trachea is never difficult, and as the disease rarely extends to the trachea, the opening is at some distance from the location of the disease. As, however, there are instances where the obstruction lies in or about the trachea, it is well, generally, to make the incision at as low a point as possible. The dangers of hæmorrhage may be avoided by care in operation, passing down to the trachea, layer by layer, using hæmostatic forceps at every bleeding point, and tearing through the pretracheal connective tissue until the air-tube is exposed. If possible, all hæmorrhage should be stopped before opening into the trachea. Trousseau advises to cut out the edges of the tracheal wound with the scissors—this is better accomplished by the use of the tracheal fenestrum forceps of Fowler.¹ *Tracheotomy en un temps*, advocated by Chassaignac and Saint Germain while expeditious, is hazardous, because of the great possibility of hæmorrhage, and should be used only in case of the most absolute necessity. Incision with the galvano-cautery, thermo-cautery or actual cautery can render excellent service in expediting the operation without endangering hæmorrhage.

In tracheotomy in tuberculosis, anæsthesia should be absolutely rejected in case the lungs are affected. Where the disease is confined to the larynx, and the patient is in good physical condition otherwise, it may be safely used.

Sixty per cent. of cases of laryngeal phthisis, otherwise fatal, have been relieved by this operation, against thirteen per cent. relieved by medical treatment. Even in cases where the patient has died after the operation, death has been due to other lesions than those of the larynx. It follows then, that, though tracheotomy offers some disadvantages, like all operations, the benefits to be derived from it so greatly surpass them, that there should not be the slightest hesitation in attempting it in all cases of severe dyspnoea of tuberculous origin affecting the pharynx, larynx, or trachea.

JAMES E. PILCHER.

¹ *Annals of Anatomy and Surgery*, vol. vi, p. 131.

PASSAVANT ON TRACHEOTOMY FOR DIPHThERITIC CROUP.

For some time there has been appearing in the *Deutsche Zeitschrift für Chirurgie* a treatise on tracheotomy in diphtheritic croup, by Dr. Gustav Passavant, the attending surgeon at the Senckenberg Hospital, at Frankfort on the Main, who is well known as an elegant and subtle observer, and his communication may be held to represent the present aspect of the subject in Germany, as far as the general treatment of the subject is concerned; the series already at hand being complete in their way, we present an epitome of their contents.

In a short introductory note, the author states that he does not consider croup and diphtheria as identical, but believes that the difference is apparent only in the general aspect of the case, and that a generally accepted pathognomonic symptom has not yet been found. In this he is at variance with the followers of the school of Cohnheim, now largely in vogue in Germany, who consider the difference between the two diseases only one of intensity. He believes, however, that for the last thirty years no cases of true croup have occurred in Germany.

He then proceeds to give a short historical sketch of the history of the operation of tracheotomy in Germany. It was here introduced from France, where it had been in vogue since 1820, and was not performed much before the year 1848; he believes croup to have been very rare, and diphtheritic croup not extant at this time.

Believing tracheotomy to be indicated whenever oxidation and decarbonization of the blood is deficient, he considers the operation combined with little or no danger to the patient, death occurring by the progress of the disease towards the lungs, those cases of death from infection of the wound being exceptional.

The progress is to be estimated according to the advancement of the disease towards the capillary bronchi, but it may be also judged by the phenomenon of the retraction of the soft parts of the thorax and jugulum during inspiration, which points to an obstruction in the larynx; if this symptom is wanting the bronchi are obstructed, and there is little hope for recovery; the larynx is also raised up higher during inspiration, when the obstruction is seated high up; the physical signs of hyperæmia in the lower parts of the lungs also obscure the prognosis.

The objects which the operation has in view are: to remove the danger of suffocation; to facilitate the expectoration of mucus or false membranes; to gain time that the disease may recede; to make it possible the better to attack the disease *in situ*, by inhalation and mechanical means; to preserve the strength of the children, who otherwise exhaust their forces in struggles for air; to prevent an abnormal dispersion of blood in the lungs, or, if already produced, to possibly remedy it; and, if possible, by means of an early operation, to assist in saving the lungs from becoming affected with the disease.

The question as to the time of operating, and whether it is not better to operate upon a child unnecessarily than to delay till there is less prospect for recovery, call forth an inquiry as to whether, and in what manner, the operation can influence the disease, and an examination of the dangers of the operation *per se*. This latter theme being made the subject of detailed consideration in the course of the essay, the author first concludes, in answer to the first question raised, that an early operation, as soon as the first signs of dyspnoea are noticed, is a very great desideratum, and gives an extensive exposé of the manner in which the lungs react upon the conditions obtaining during the period of prolonged serious dyspnoea, namely by causing simultaneously with the phenomenon of retraction of the epigastrium, etc., an action on the lung surfaces analogous to the cupping-glasses applied to the skin and mucous membranes, and producing hyperæmia, stasis, splenisation, atelectasis, mucous hypersecretion, and also, by a reaction on the right ventricle of the heart, œdema of the lungs. Moreover, the seat of these affections is in the posterior inferior portion of the lungs, for the reason that the upper and front parts expand more readily during the forced inspiration, while the lower ones become compressed by the retractions in the yielding parts of the thorax; the upper parts are therefore also the seat of emphysema and anæmia.

In drawing a parallel between the conditions induced by an early and a late operation, the author points out that, after early operations, if obstructions occur, they are more likely to affect only single bronchi, instead of, as when seated in the larynx, the lungs *in toto*, thus leaving the other parts free and establishing a greater chance for recovery; and when obstructions of the bronchi do occur, they are more likely to

occur in the upper portions of the lungs, which is again more favorable to recovery—the lower portions being larger and of greater import in respiration, allowing also of a more normal action of the diaphragm, and by this means saving the child's strength. The operation also represents the best mode of treating hyperæmia, etc., of the lungs, already set up; the action of the first suffocatory paroxysms having already produced unfavorable conditions.

On the other hand an early operation, besides presenting an opportunity for the establishing of another diphtheritic focus by infection of the wound, favors the development of emphysema, as the child breathes with great exertion, and the air has at the same time sufficient access to the lungs. The observation, however, that more extensive membranous formations are found in the lungs of patients, who have been operated upon *intra vitam*, is simply due to the fact that they have lived so much the longer, because operated, and the membranes have had time to form.

The age of the children should not present any obstacle to the performance of tracheotomy, as the younger children, especially those under two years, stand the operation very well, but they are more seriously affected by the disease on account of the narrowness of the air-passages. Neither should any complication of the disease, nor any stage of the disease deter from operation.

As to the use of chloroform during operation, it is desirable, if the dyspnoea be not too well developed, or if the blood be not over-charged with carbonic acid.

In regard to the most convenient mode of operating, opinions differ; in the low operation, as compared with the high one, one meets more vessels (branches of the art. thy. inf. and sup.; art. thy. ima.; art. anonyma); the trachea lies deeper; the wound is larger; the danger of burrowing of pus into the anterior mediastinum is greater; the art. anonyma is liable to be eroded by pressure of the canula; the thymus gland is liable to overlap the trachea; on the other hand the trachea is of greater calibre, allowing the use of a larger-sized canula.

In the high operation the isthmus of the gland is in the way; its depression or incision causes loss of time. Accession to the trachea is easiest between the thyroid and cricoid cartilage; but here is danger

of wounding the art. crico-thyroidea; the space is too small and the canula is forced into an oblique position and presses upon the posterior wall of the trachea; only the smaller sizes of canulas can be used here.

Incision of the cricoid cartilage is not advisable; in adults it is too rigid and osseous; it is the narrowest part of the trachea, so that the lower part of the canula is too large for the trachea, and mucus and débris accumulate; the cricoid cartilage can be easily turned in, being a complete cartilagenous ring, and thus cause difficulty in healing the wound again; the setting in of gangrenous diphtheria is greater here than elsewhere, on account of the loose areolar tissue surrounding it; and the destruction of the adjacent parts or constriction after necrosis is here more serious, on account of the proximity of the vocal cords; in the case of a short neck, the chin will also cause depression of the outer opening, and cause the lower end to press upon the mucous lining of the trachea at the back. This method is consequently only to be used when the patient's life is endangered by delay.

The mode of operation most warmly recommended is that of Müller and Bose, consisting in dissecting the thyroid gland away from the trachea, depressing it and entering the trachea through the upper tracheal rings, which combines the advantages of a very slight hæmorrhage (art. cricoidea) with that of a support for the canula. A very detailed description of this operation is given, the author being in favor of not making the incision into the trachea, until it is completely laid bare, and all hæmorrhage stopped, and of applying a solution of iodoform in collodion (1 in 9) to the wound. Asphyxia setting in is to be met with in the usual way, by artificial respiration, and by endeavors to clear out the air-passages, sprinkling the face with cold water and percussion of the region of the heart.

The author next enters upon a digression concerning the properties and the construction of the canula, with great attention to detail, and with the help of many illustrations and theoretical deductions of a mathematical character, and arrives at the conclusion, that the width of the canula, the length of that part which lies inside the trachea and below the wound, and the radius of its curve is given by the width of the lumen of the trachea; but the segment of the circle representing its length by the distance of the incision in the trachea from the surface of the skin.

For instance, a child of two to four years of age would need a canula of six to five millimetres diameter (measured on the outside), of five millimetres lumen at the lower end, of eleven millimetres in length from the lowest point of the incision in the trachea, to the end of the canula (measured by a straight line), of eighteen to twenty-five millimetres length of the part projecting out of the trachea (measured from the lower angle of the wound); of eighty-one to one hundred and one degrees segment of a circle of twenty-one millimetres radius, measured on the concave side, and from the back of the plate to the lower end.

The innervation of the larynx and trachea is fully given; the sensibility of the latter is chiefly situated in its posterior mucous surface, but is easily overcome by its becoming accustomed to irritation.

In the care of the patients after operation trained nurses are of great value; they must, besides attending to the feeding and carrying out the medical treatment, be able to see to the canula and prevent asphyxia occurring through occlusion by detached membranes, etc., and be trained in the use of Trousseau's dilator.

In case catarrhal pneumonia sets in, applications after Priessnitz, and inhalations of steam are advised, as well as a prone position of the child while in bed and when carried about; but no detailed consideration of internal medication is given, and none recommended as useful; and use of steam is preferred to intra-tracheal injections, although mention is made of a few.

The employment of the catheter (beside the use of suitable forceps) for extraction of obstructions in the air-passages, when the respiration becomes embarrassed, is extensively considered. The indication for aspiration in the course of diphtheria is given, whenever false membranes or mucus below the canula cause a hindrance to free respiration, or, if immediately after tracheotomy the breathing is not relieved. The catheter, one of large size with a large opening, Jacques' or Benti's, with a woven eye, being used, is to be connected by means of a rubber tube with a rubber ball, an exhaustor or an evacuating syringe, before introduction, and the wound to be kept dilated the meanwhile.

The dangers of employing the catheter for aspirating the débris in the trachea, consist in the possibility of occasioning small lesions in the trachea and affording the disease new foci, and giving rise to ulceration;

in the increased secretion of mucus and hæmorrhagic exsudation by repeated irritation of the trachea, and consequently increased obstruction; in the probability of pushing down occluding formations still further and wedging them in; and in the disadvantage of only being able to remove small portions at a time, without injuring the child too much. These disadvantages are counterbalanced by the possibility of being able to save the life of the patient; it is the only method of directly attacking the mischief in its seat. The operation, if a smooth and pliable catheter be used, is easily tolerated, and it is one which is destined, in the opinion of the author, to become very generally resorted to; and the technique can be so developed, that with the help of a Mercier's or American bent catheter, with a velvet eye, made for the purpose, the bronchi can without difficulty be cleared out.

The author himself has given considerable attention to this subject, and, with the help of Aeby's celebrated anatomical study in systematizing the bronchial tree and repeated post-mortem experiments, has satisfied himself that passing a catheter into a given lobe of the lungs, was easy of execution, and with the help of an inflatable rubber envelope to the catheter, he found he could introduce water into the lobe, and withdraw it again without damaging the rest of the lung; and that by inflation of air a ready oxidation of the blood in the lobe could be attained; but, that by forced aspiration the water became sanguinolent in color.

Turning these experiments to account *intra vitam*, he found it much easier to remove liquid mucus from parts of the lungs, than inspissated mucus and membranous débris, and believes some fluid which would either dissolve the membranes and render the viscid mucus different, or, indeed, render the membranes more coherent and shrink them, so that they might be extracted *in toto*, to be the main desideratum of the future.

Inflation of air into the lungs after aspiration, should be attempted only with greatest caution, so as not to occasion emphysema; but in collapsed or compressed portions of the lung it might be of great advantage in aiding the accession of air.

The author promises further contributions upon other phases of this subject. These will be reviewed as they may appear.

W. VAN ARSDALE.

PROCEEDINGS OF SOCIETIES.

SOCIETY OF GERMAN SCIENTISTS AND PHYSICIANS.

The Fifty-seventh Annual Convention of German Scientists and Physicians took place at Magdeburg, on the 18th of September, 1884, lasting until the 23d, and being very well attended; Berlin, Halle and Leipzig were especially well represented, and, proportionately, much better than Southern Germany. Strasburg was selected for the place of meeting next year. A new feature was introduced at this convention, which met with universal approval, the credit of which is said to be due to Aufrecht—that of having full printed reports of the proceedings of the previous day circulated every morning, in the form of a journal, so that each visitor was enabled to keep *au courant*.

A paper of special bacteriological interest, on the subject of "Micro-organisms in Infectious Diseases of Wounds," was contributed by Prof. Rosenbach, in the first general session.

In the surgical section, quite a number of interesting communications were made. Prof. Hagedorn, of Magdeburg, having opened the session by leading the assembled visitors through his department of the Hospital, and at the same time demonstrating some cases where extensive transplantations of skin had been successfully performed, presented three cases of exarticulation at the knee-joint for discussion, in the course of which, different opinions were expressed as to the efficiency of the operation: in some cases free use of the limb resulted; in others the limb could not be used to support the body on, as Volkmann, of Halle, and Petersen, of Kiel, experienced in amputations of the femur at the condyles, and in Gritti's operation. He also demonstrated a contrivance for correcting pes varo-equinus in children; and presented a patient who had at three different times, in intervals of a year, fractured the same patella, the limb being restored to complete functional ability.

OPERATIONS FOR HARE-LIP.

Prof. Hagedorn also read a paper on the subject of the "Operation for Hare-lip in Small Children," pointing out that in the method hitherto in use, described by König, in the 19th vol. of the *Zeitschrift für Chirurgie*, a weak place exists at the point where the three sutures meet, which often frustrates primary union, and propounding a new method, namely to make two long incisions, one on either side, through the entire substance of the lip, parallel to the red border, to which he joins, on either side, an oblique cut with the scissors of an upward and lateral direction, running from the median angle of each part of the lip and meeting the first incision on the wider or median side of the fissure, near its angle, but on the narrower and lateral part, at its lateral point, respectively. After the junction the line of suture represents a bayonet form; the lip shows no retraction at the point of adaptation, and, all tension being avoided, nothing prevents a union by first intention. Several modifications and adaptations to double fissure were mentioned, and histories of three cases, the youngest representing the age of five days, were given.

NEPHRECTOMY.

Von Bergmann, of Berlin, spoke on "Nephrectomy," having himself four times in the course of the last year successfully performed the operation; altogether it had been done 121 times, being indicated either by malignant tumor, in which case it is a dangerous operation on account of the double incision of the peritoneum (17 out of 24 cases terminating in death); or by pyelo-nephritis, when half of the (40) cases recovered. Both kidneys are rarely diseased—in 40 cases, only twice.

SUPRA-PUBIC LITHOTOMY.

Von Bergmann also spoke in favor of litholapaxy and of the supra-pubic operation of lithotomy, to which latter he even gave the preference, for the reason that often, even in litholapaxy, small concretions remained in the bladder, causing recurrence of the disease, and on account of the facility of palpating the entire bladder through the wound. Ten cases, many over seventy years of age, resulted favorably. Volkmann, of Halle, concurred in this opinion, characterizing lithotritry and litholapaxy as methods no longer suitable to antiseptic times.

ORTHOPEDIC APPARATUS.

Heussner, of Barmen, after demonstrating an apparatus in principle like a double Taylor's splint, made for a girl suffering from spinal paralysis (but able to use the ileo-psoas muscle), and having for attachment to the leg and thigh a complete hose, of strong material, presented a young woman, twenty years of age, for whom he had excised both hip-joints for congenital luxation, and who was now able to walk with the help of a cane.

EFFECTS OF LIGHTNING-STROKE.

Heussner also narrated his experience of the effect of lightning-stroke on the human body, having had occasion to observe several cases in the month of July, when the lightning struck into a numerous assembly, immediately prostrating twenty persons and killing four instantly. The persons struck presented pallid and distorted countenances, cold extremities, a condition of the lower extremities resembling that after an application of Esmarch's bandage, with paraesthesia, pains in the soles of the feet. On the body various burnt places were found, and on the soles of the feet, as well as in the boots (excepting those with large nails), and stockings, about twenty holes in each, of the size of a pea to that of a dime, with burnt edges. The clothing was destroyed in direct proportion to the proximity to the epidermis, which yielded the greatest resistance to the current. Of internal organs none suffered. The persons struck had no remembrance of what had passed.

EXCISION OF THE PYLORUS.

Küster, of Berlin, spoke on excision of the pylorus, and stated his opinion that this operation was to be much restricted, on account of the disposition of the transverse colon, if severed from its mesentery, with occlusion of branches of the mesenteric artery, to become gangrenous; this occurred in a case of his, where resection of the stomach was attempted for cancer, but which was given up on account of debility, but not till after the colon had been liberated; the post-mortem revealed gangrene of the detached piece. He advised, however, tentative laparotomy in every case.

RUPTURE OF INTESTINE COMPLICATING STRANGULATED HERNIA.

Rosenberger, of Wuerzburg, had found, in a man seventy-five years of age, exhibiting symptoms of incarcerated hernia, not only what had been diagnosed, a ruptured sac, but a complete rupture of the intestine, covering the wound with fecal matter, which he treated with silk suture and reposition, the operation taking place three hours after the strangulation; the case, as well as a case of superficial rupture of the serous membrane, also sutured, recovered, but has since died of senile debility.

LAPAROTOMY FOR INTESTINAL PERFORATIONS.

Milkulicz, of Cracow, stated his conviction that perforation of the stomach or intestine, from whatever cause, either pathological or accidental, represented an indication for laparotomy, which was not to be influenced by the presence of peritonitis, as long as the strength of the patient permitted. Of four cases to which he referred, one case, probably a perforated typhoid ulceration, with suture of the ruptured part, subsequently recovered; one case of volvulus, where the obstruction was found, died of intercurrent pneumonia; one case, rupture of stomach, died in three hours; and one of perityphlitis, with obstruction, where the obstruction was not found during life, died five days after the operation.

MINOR CONTRIBUTIONS.

Petersen, of Kiel, demonstrated his method of adjusting the plaster of Paris jacket, by placing the patient in a position of horizontal extension, the projecting knuckle supported by a Barwell's suspension. He further reported a case of osteomyelitis of the clavicle in a subject, seventeen years of age, in which he had completely removed the entire bone, with more than half of its periosteum detached, only eight days after the first illness; after four weeks an entire new bone had formed; and, after six, the patient was able to work. He advised the removal of all smaller bones so affected, on account of the time gained in the end by this means.

Stein, of Frankfort on the Main, showed a very small, yet at the same time very powerful, galvanic battery, for galvano-caustic and electric-lighting purposes, made by R. Blaensdorf, in Frankfort.—*Centralblatt für Chirurgie* (in part).

THE SOCIETY OF SURGERY OF PARIS.

SESSIONS FROM OCTOBER 1 TO 15, 1884.

OVARIOTOMY.

M. Terillon presented some reflections, based upon thirty-three operations of ovariectomy, performed by himself. Of these twenty-nine recovered and four died. Twenty-seven who had been recently seen again were all in good health. One, in whom the operation had been incomplete, is the subject of renewed growth of her tumor. The remaining one had died at the end of a year of diffused cancer. M. Terillon had made, besides, two exploratory incisions for an ascites of unknown cause, and for a cancer of the peritoneum. Both had recovered from the operation. The patients had generally undergone one or several punctures before the operation, which had always been done with minute Listerian precautions. In eleven cases the cysts had few or no adhesions; in fourteen such adhesions had been formed that careful dissection and multiple ligatures were required; the eight remaining had infiltrated the broad ligament, and of these, in four, it was impossible to effect their complete removal. In cases of inflammatory adhesions, on the contrary, the operation was always completed.

The experience of the reporter had been, that the escape of the contents of a cyst into the peritoneal cavity, even when gelatinous, entailed no unpleasant consequences, if proper cleansing is done. He had never employed drainage, except in cases of incomplete ablation.

The length of time consumed in operations is of no great importance. A matter of greater import is the extent of the surface exposed by the severing of the adhesions. It is well to know that apparently grave immediate symptoms (as vomiting, pain, high temperature) may disappear absolutely at the end of some days, and that they do not indicate peritonitis.

Among the more remote accidents of ovariectomy, M. Terillon has observed small abscesses in the abdominal wall at the seat of the sutures; one case of rupture of the abdominal wall and disembowelling, owing to carelessness on the part of the patient; and, lastly, one case

of subsequent development of a sarcomatous mass in the abdominal cicatrix, a case in which the cyst had not presented any special characteristics, except that its internal wall presented numerous vegetations. Such facts are not rare, and the author has met not a few examples of them.

The contraindications to ovariectomy are becoming more and more rare. Even very extensive adhesions do not forbid the operation, since incomplete operations may result in cure, or at least prolongation of life.

ECTRODACTYLIA.

M. Guérmonprez, of Lille, described in detail a case of ectrodactylia, in which there was total absence of the three middle fingers and of the corresponding metacarpal bones. A comparison of the functional value of this hand with that of a subject who had suffered disarticulation of the three middle fingers at the metacarpo-phalangeal joint, led the reporter to conclude that when ablation of the three middle fingers is necessary, it would be better to take away at the same time the corresponding metacarpal bones.

ESTLANDER'S OPERATION.

M. Nicaise presented an unpublished memoir of M. Saltzman, of Helsingfors, upon the operation of Estlander. Five cases formed the basis of this memoir. The first was that of a man, of twenty-one years, who had an empyema consequent upon a pleurisy that had begun at the close of 1880; a spontaneous opening took place in March, 1881, in the fourth intercostal space. One year after the beginning of his trouble he entered the hospital, and was subjected to resection of the fourth, fifth, sixth and seventh ribs, to the width of about five centimetres; the section of the lower ribs was made at points farther back than that of the upper, in order to take advantage of the greater inclination of the thoracic wall for the turning in of the flap. A counter-opening was also made behind and below. The patient was entirely cured at the end of three months.

M. Nicaise remarked that, according to the cases which he had analyzed, those in which a pleuro-cutaneous fistula had formed spontaneously are the most favorable for the operation of Estlander.

The second case was that of a man in whom a left pleurisy had de-

clared itself early in 1883. In the following July the pus spontaneously discharged externally. In November he was operated upon. About four centimetres each of the third, fourth, fifth, sixth, seventh, eighth and ninth ribs were removed, in the same manner as before. On the 31st of January, 1884, he was discharged cured.

The third case was more complicated. The patient was a woman of thirty-five years who had a pleurisy in the autumn of 1878. In 1881, September 24, 1800 grammes of pus were removed by puncture, followed, two days later, by pleurotomy with resection of a bit of the sixth rib; two months later a counter-opening, with resection of the eighth rib, was done; finally, on the 27th January, 1882, the previous operations having effected only temporary amelioration, and the cavity still containing 100 grammes of liquid, about six centimetres each of the third, fourth, fifth, sixth and seventh ribs were taken away. The patient improved and the cavity was reduced in size. Two years after this last operation the patient returned, with a fistula still persisting, and underwent a new resection, involving the ribs from the second to the ninth, inclusive. By the 30th April the cavity contained not more than 50 grammes, and M. Saltzman was hoping for its complete obliteration.

The two concluding cases had to do with recent operations, the final results of which were not yet definitely secured.

M. Saltzman based upon these operations certain remarks. He prefers the incisions of Estlander (incisions parallel to the ribs, one above the other, each sufficing for the removal of two or three ribs) to the large flap proposed by Bouilly, the reflecting of which is difficult, which often provokes abscess, and which renders the operation more bloody. It is necessary to always employ the subperiosteal method without fear lest the reproduction of bone should compromise the result, retraction taking place very rapidly when it ought. Resection of the pleura is useless and may cause complications. The extent of the ribs that should be removed must be in proportion to the size of the cavity; no mathematical proportion can be established. The operative prognosis is absolutely favorable, provided the antisepsis is rigorous. It is necessary to use subsequent irrigations only when the secretion is abundant and there is retention of liquid, with elevation of temperature. Great

care should be exercised not to submit the cavity to undue compression, and the use of two large drainage tubes is desirable. Finally, the proportion of complete cures will be the greater the earlier the interference, before the patients become exhausted.

M. Nicaise added two observations to those of Saltzman. The first was a tuberculous patient, who had a vast empyemic cavity upon which N. refused to operate in January, 1884. The man soon died, and a resection of seven ribs, done on the cadaver, was not sufficient to efface the cavity; the lung was collapsed and bound down in the vertebral gutter to such an extent that any operation would have resulted fatally. The second observation was a case of Estlander's operation, involving from eight to eleven centimeters of seven ribs, done by N. on a man thirty years of age, who had suffered from empyema for two years, for which a pleurotomy had been done, in the eighth space, in March, 1883. The last operation was in June, 1884. Temporary improvement resulted, but the patient soon succumbed to the advance of his pulmonary tuberculosis.

M. Nicaise also added certain remarks as to the mode of incision, after having experimented upon the cadaver; he prefers the procedure recommended by Estlander, in which the lower incision is alone in relation with the fistula, and the more regular wound does not present anfractuositities hidden by a flap. He recommends to take away the lower ribs at points more posterior, or to make a counter-opening at that locality. He discourages excision of the pleura in case of a large cavity, but thinks it useful in other cases. It has been employed with success by Boeckel, but has failed in the hands of others.

M. Lucas-Championnière had operated three times on the same patient, who had been much benefited each time, but still retains a fistula. He thought the choice of operative method must depend on the region involved. It would be necessary to interfere earlier than had been the custom. Resection of a rib, simultaneously with pleurotomy, would increase the frequency of cure in those cases in which the pleural contents escaped with difficulty. This resection is easier than when the spaces are enlarged by distension; imbrication of the ribs, on the contrary, renders this resection sometimes very difficult, especially when a second or third operation is required.

M. Monod had operated a year ago on a patient, upon whom a second operation will be required. Rapid and permanent results are not obtained as often as was at first expected.

M. Desprès had recently seen a patient, who for ten years has had a pleural fistula opening in the axilla. The fistula is a very narrow one. The health of this person is excellent, and he is able to attend to his work. Such cases are to be taken into consideration in determining the real value of the operation of Estlander, as well as late spontaneous cures. He believed that this operation would succeed only in patients under twenty-five years of age who had been operated on within a year, at the most, after the establishment of the fistula.

M. Chauvel reported two cases that had been operated on at Val-de-Grace. In the first case, two operations had been done, removing portions of six ribs. In the second, the same number of ribs had been resected. In both, only partial success resulted; suppurating cavities still remaining unobliterated. He believed his lack of complete success to be due to insufficient resection.

M. Bouilly had operated six times on five patients; two complete cures were obtained, one in fifteen days, and the other in seven months, but in this case, after four months of good health, a recurrence took place, necessitating a new operation. One case died from acute septicæmia, one was improved, and one was still under treatment.

What are the causes of failure? Excluding those tuberculous patients who are incapable of supplying the material required for an adhesive inflammation, insufficient resection remains the great cause. Sometimes it may become necessary to resect the first ribs, which is not without danger. M. Bouilly insists very particularly upon the necessity, before attempting the operation, of obtaining exact information as to the extent and form of the pleural cavity. This should be explored, like the bladder, with sounds of various curves; this exploration may be completed in the course of the operation, after the resection of one or two ribs; injections, auscultation and percussion can furnish only complementary information.

Another cause of partial failure consists in the slight tendency to retraction manifested by the pleura, in consequence of its great thickness and its feeble vitality. In this state it suppurates a little, but does not

produce granulations. The operation of Estlander is no longer sufficient then, resection of the pleura must be added.

M. Verneuil would not perform this operation upon aged or tuberculous subjects. He agrees in the great importance of becoming accurately informed as to the form and dimensions of the cavity, but thinks that explorations with sounds are most deceiving, and that injections are of much more value. The capacity should determine the choice of procedure; a small cavity will heal by a sufficient enlargement of the fistula, so that granulation from the bottom toward the surface may take place, an operation more simple than costal resection.

M. Verneuil cited several cases, one, pleural abscess with costal necrosis; a second, hydro-hæmothorax from a pistol-shot, with consecutive purulent pleurisy; the third, pleural fistula with quite a small cavity and considerable thickening of the pleura; these have healed without Estlander's operation; the first, after a free incision with thermocautery, resection of the carious rib and antiseptic irrigations; the second, by simple drainage and irrigation; the third, by the resection of the thickened portion of the pleura, facilitated by resection of a single rib. In this case, V. sought only to expose the bottom of the wound, and not to produce retraction of the thoracic wall, which is the sole object of the operation of Estlander. Analogous operations, practised for quite another purpose, should not be confounded with the operation of Estlander.—From the *Revue de Chirurgie*.

NEW YORK SURGICAL SOCIETY.

SIMULTANEOUS INCOMPLETE WOUND OF FEMORAL ARTERY AND VEIN— LIGATION IN THE WOUND—RECOVERY.

At the meeting of the New York Surgical Society, held Nov. 11, 1884, Dr. Pilcher presented a man, aged thirty-four, who, on the evening of May 17 last, accidentally stabbed himself with a long, narrow bladed knife, the blade entering the upper and front part of the right thigh, a little below the line of Poupart's ligament. The overwhelming hæmorrhage which at once followed was, fortunately, quickly controlled by pressure at the hands of Dr. N. B. Sizer, of Brooklyn, who happened

to be within call at the moment of the accident. This pressure was then assisted by the insertion of a tampon into the wound, until the arrival of Dr. Pilcher later, and thus time was afforded to make the necessary arrangements for the permanent arrest of the hæmorrhage. The parts adjacent to the wound were shaven and cleansed, and as full an effort made to conduct the required operative procedures without septic contamination as was possible under the circumstances. The original wound was a transverse cut of only three-fourths of an inch in extent. A longitudinal incision of some inches in length was made, extending above and below the stab cut, while pressure was kept up at the point from which hæmorrhage proceeded. The femoral vessels in Scarpa's space having been fully exposed, it became evident that the knife had pierced the femoral vein about an inch and a half below Poupart's ligament, and, having divided its outer half, had also divided the adjacent inner half of the femoral artery, inflicting thus an incomplete wound upon both the main vascular trunks of the limb. While pressure was still directed upon the vein wound, the artery, being compressed above, was completely divided at the point of wound, and the divided ends each secured by a catgut ligature. More difficulty was experienced in dealing with the vein, for although adequate pressure was made upon it, both above and below the wound, the moment the pressure upon the wound itself was interrupted, a most copious flow of blood would deluge the field of operation. The embarrassments of the moment were increased by the dim light, which was but little bettered by the lamp of the ambulance surgeon who was acting as one of the assistants, and by the fact that the previous infiltration of the region with blood had become such as to obscure much the distinctions between the tissues of the parts usually available for the guidance of the surgeon. Further dissection, however, finally revealed two large muscular vein-trunks entering the femoral vein from behind, just opposite the point of the wound. A ligature having been tied about each of these, the further dealing with the main trunk, by severing it and tying separately each end, was accomplished without difficulty. The wound was then irrigated with sol. hydrarg. bichlor., 1-1000, and closed with sutures, proper bandaging and compresses being applied to ensure union by first intention. Suppuration, however, took place,

and on the third day the wound was re-opened at its most dependent point, and drainage tubes inserted, and irrigation resorted to. A sharp attack of cellulitis following the line of the sartorius muscle followed, necessitating several counter-openings for drainage for its control.

The patient rallied well from the extreme loss of blood, sustained at the time of the accident. After the eighth day his progressive convalescence was assured. His perfect recovery was delayed by the fact that some of the catgut ligatures proved to be irritants, and determined circumscribed phlegmons at the points where applied that suppured. These all finally closed, and on the 2nd of July he began to again attend to his business.

Later in July another small phlegmon formed at the site of the lower ligatures, which, however, occasioned only a temporary inconvenience. While lying in bed no disturbance of the nutrition, nor of the circulation even, in the affected limb was noticeable. After getting up, the tendency to œdematous swelling of the leg was quite marked. This was easily controlled by an elastic stocking, and at the present date has become much less marked.

At no time in the history of the case did any noticeable disturbance in the nutrition of the limb occur. In the early days, after beginning to walk about, there was marked œdema and weakness of the leg; an elastic stocking sufficed to control this. To-day, about six months after the injury, he has used no support to the limb, and inspection shows a barely recognizable tendency to œdema of the leg. During the operative procedures required for ligating the vessels at the time of the injury, neither the profunda artery nor the internal saphenous vein came into view, but it may be assumed that the wounds were below the points where these vessels join their respective main trunks.

Beside the interest attaching to the peculiar nature of the wound itself, and the fortunate conjuncture by which immediate death was averted, special interest attaches to the bearing of the case upon the treatment of wounds of the femoral vein. The history of the case demonstrates the value of diminishing the arterial supply to the limb, when the great vein outlet of the limb has been occluded, but as a means of controlling the hæmorrhage from the vein wound, it has been seen that the ligation of the femoral artery was valueless, for the ap-

parent profuseness of the flow from the vein wound was not diminished after the artery had been secured.

Dr. A. G. Gerster reported a case which occurred in his experience five years ago, and belonged to the class of injuries included in Dr. Pilcher's case. One of his colleagues at a city hospital had removed the inguinal glands from a young man. It was thought later that instead of an eight per cent. solution of chloride of zinc being used, by the mistake of a nurse, a much stronger solution was employed for washing out the wound, at the bottom of which the femoral vein and artery were exposed. Three days after the operation an exceedingly profuse hæmorrhage occurred, and the house surgeon did not know better than to throw an elastic bandage around the limb below the point of bleeding, because it was venous blood which poured out of the wound. The constriction was sufficiently strong to compress the vein, but not the artery, and the limb became a reservoir for a large collection of the patient's blood.

Accidentally, Dr. Gerster called at the hospital about two hours after this had occurred. When his attention was directed to the case, he saw that local pressure was being kept up by means of large bundles of dry cotton pushed into the bottom of the wound. Naturally, it failed to control the hæmorrhage completely. The patient was nearly dead from acute anæmia. Dr. Gerster removed the clots from the bottom of the wound for the purpose of finding the source of hæmorrhage, and saw that a piece about one inch long and one-quarter of an inch wide, belonging to the anterior wall of the vein, had sloughed out, and through this large opening great quantities of blood had poured forth,

The artery being exposed in the bottom of the wound, his first thought was to adopt Langenbeck's proposal to occlude the femoral artery, which was easily accomplished by pressing it against the pubis. But this did not control the hæmorrhage, wherefore the idea of ligating it was abandoned. There remained, therefore, nothing but to ligate the vein itself, and he divided the vessel as Dr. Pilcher had described, as well as possible while pressure was being constantly exerted upon it above and below, and applied ligatures on both ends. The hæmorrhage, however, did not cease, and continued because large muscular venous trunks entered from behind. By the time these were exposed and tied the patient had expired.

Undoubtedly it was not external hæmorrhage alone in this case which caused the fatal issue, because one of the largest limbs of the patient was engorged with blood to its utmost, and was not only cyanosed but was necessarily increased in circumference.

ANEURISM OF THE RIGHT SUBCLAVIAN ARTERY.

Dr. Gerster presented a patient upon whom he had tied the right axillary artery in the first part of its course, just below the clavicle, Jan. 16, 1884, for aneurism of the subclavian. As a result, the patient's general condition had greatly improved; the abnormal pulsation and bruit in the arterial tumor had entirely disappeared, and only a well-perceptible fullness and resistance remained in the superclavicular fossa, as compared with that of the other side. Recently, pulsation had again become perceptible in the radial artery.

JOINT EXCISIONS.

Dr. L. A. Stimson presented a patient, a boy sixteen years of age, upon whom he had performed an osteo-plastic excision of the elbow-joint six months previously. The patient can now flex and extend the elbow actively, and the restoration of the form of the limb has been good. Dr. W. S. Halsted presented cases of partial resection of the elbow and of the shoulder, for tuberculosis, and of the ankle for traumatism, in all of which excellent results had been secured.

EXTRA-CAPSULAR FRACTURE OF NECK OF FEMUR.

Dr. J. C. Hutchison read a paper detailing a case of injury at the hip, which was believed to have been a case of extra-capsular fracture of the neck of the femur. The patient, a medical gentleman fifty-six years of age; had been violently thrown to the ground from a high vehicle, the force of the fall being received upon the outer side of the great trochanter, transversely to the axis of the neck of the femur. Though the patient walked a few steps, with assistance, after the accident, and no manipulation was allowed for the purpose of detecting crepitus, and little, if any, shortening, and no eversion of the foot, was present, the pain in the femur, depression of the trochanter, and an unnatural fullness in the inguinal region, were considered as sufficient to settle the diagnosis of an impacted extra-capsular fracture. Pressure against the trochanter major gave great relief, and was constantly kept

up. Towards the end of the third week, a marked, painless swelling, unmistakably callus, was noticed in the groin. The patient was transported from the scene of the accident to his home, a distance of two hundred miles, without loosening the impaction; on the fortieth day the dressings were removed; on the forty-third day the patient began to move about on crutches, and on the eighty-fourth day he laid aside his cane. Eleven months after the injury there is nothing to indicate the injury, except the diminished prominence of the trochanter major, flattening of the corresponding side of the nates, and an unnatural fullness in the inguinal region; there is no lump, the motions of the joint are perfect, there are no osteophytes.

Every experienced surgeon is aware of the difficulties sometimes attending the diagnosis of fracture of the neck of the femur, especially when the upper fragment is firmly implanted in the cancellated tissues of the lower. A majority of the symptoms of fracture may be present in cases in which the neck of the femur is uninjured; and, on the other hand, fracture may be unaccompanied at first by the more important of the usual diagnostic signs. In cases of violent contusion of the periarticular muscles of the hip, all the component parts of the joint having received a severe shock, the result of a fall upon the trochanter, the symptoms at first are almost identical with fracture. In either case, there may be eversion of the foot, shortening of the limb, which existed prior to the injury, an absence of crepitus, and an inability to raise the extended limb from the bed by a voluntary effort. In such a case, how are we enabled to ascertain the real nature of the injury? This can generally be done by observing the relation which the trochanter major bears to the anterior superior iliac spine. When the relative position is the same on each side, it usually indicates that there has been no other injury than contusion, but when it is altered in a joint previously healthy, it denotes the presence of fracture.

A change in the normal relation of the two processes does not, however, always indicate the existence of fracture. A change in the position of the trochanter major with reference to the iliac spine may have been produced by chronic rheumatism of the hip-joint. In such a case the bearings of the trochanter with respect to the iliac spine will not serve as a diagnostic mark between a contusion of the hip and an

impacted fracture of the neck of the femur. The previous history of the case will, however, assist in determining the nature of the lesion. In investigating these injuries, however, we should not form our opinions from any particular symptom, but all the symptoms which the case presents should be considered, in order to arrive at a correct diagnosis. In the case under consideration, the pathognomonic symptoms of fracture were: First, depression of the trochanter major on the injured side. This process was, according to the measurement of Dr. Halsted on the fifth day after the injury, three-quarters of an inch nearer the iliac spine on the right than on the left side. Second, the spasms or twitchings in the muscles surrounding the joint, during sleep, and continuing five days. Third, the deposit of callus towards the end of the third week in the groin, on the outer side of the femoral vessels, and just below Poupart's ligament.

In any case of suspected impacted fracture of the cervix femoris, the discreet surgeon will prefer to treat the case as one of fracture, rather than incur the risk of damaging his patient by instituting such an examination as is necessary to produce crepitus. This rule should be observed, even when the bone is not impacted in the best position. It is better that malposition of the limb should not be corrected, than that impaction should be broken up by unwarrantable manipulation, and the union of the fragments thereby endangered. The most important feature in the treatment of such cases is, therefore, to maintain the impaction. This can be best accomplished by keeping the patient at rest; by avoiding undue manipulations; by moderate extension in the straight position, to steady the limb; and by lateral pressure over the trochanter, by means of a sand-bag or long external splint, or by the use of Volkmann's splint.

Violent extension would disengage and displace the impacted fragments, and make non-union almost inevitable. If, for any reason, it is necessary or desirable for the patient to go out before firm union of the fracture has taken place, this may be done with safety at the end of the fifth week, by applying one of Johnson's felt splints, or some similar appliance, enveloping the body to midway between the hip and axilla, and the thigh and leg to midway between the knee and ankle. The felt is made pliable by holding it before a fire, or immersing it in

hot water, or, still better, by covering it with a wet cloth and softening it by a hot smoothing-iron. It is then applied over a tight-fitting pair of drawers and rapidly covered with a bandage. The splint adapts itself to all the inequalities of the surface, and, if well applied, does not make undue pressure at any point.

Dr. Frank H. Hamilton said he was in the habit of assuming, when a man of the age and weight of the patient falls violently upon the trochanter major, that he has almost certainly received a fracture of the neck of the femur, probably extra-capsular. In deciding in the case under observation, as to whether it was a fracture or not, this was a very important factor in the diagnosis.

A second reason was, and of still greater importance perhaps, that there was a manifest depression of the trochanter major. That the limb was a little shortened, one-fourth of an inch perhaps, subsequently one-sixth of an inch, I might explain upon the supposition that this was normal. On the other hand, it might be that the shortening was actually greater than was represented by the measurements, because the injured limb was perhaps normally longer than the opposite limb; but that there was shortening, all who saw the patient have agreed.

With regard to the muscular spasms, I do not say that they are absolutely diagnostic of an extra-capsular fracture of the femur, but while they are often present in fractures of the shaft, they are almost universally present in fracture of the neck, especially if extra-capsular. I have explained this on the supposition that the muscles and nerves in the vicinity of the fracture have been injured somewhat. The fulness in Scarpa's region which occurred later, and which the doctor recognized, would at least lead us to suspect fracture.

All the circumstances point so distinctly to extra-capsular fracture of the neck of the femur, that I do not think we can entertain a doubt of its occurrence, but the greatest doubt is thrown upon the case by the remarkable result; that is, there is no eversion, no osteophytes are apparent, and the shortening is very slight.

Dr. C. K. Briddon saw, some years ago, a case similar to the one related by the author of the paper. The patient was on a pleasure trip, more than a hundred miles distant from his home, when he was thrown violently, his hip coming in contact with the ground; he was trans-

ported on an extemporised stretcher to a baggage car, to his home, where Dr. Briddon saw him in consultation with his family physician. The limb was disabled, he complained of a good deal of pain, could not raise his heel from the bed, there was slight eversion, the movement of inversion was hindered, there was about half an inch shortening, gentle rotation of the thigh elicited no crepitus, and when the trochanter was grasped during such movement, it was manifest that it described the arc of a lesser circle than on the opposite side; the diagnosis was, impacted fracture of the neck of the thigh bone.

Rotation of the femur revealed one symptom which Dr. Briddon has always regarded as characteristic of the lesion. In an *unimpacted* fracture, when the trochanter is grasped during rotation, it will be felt that it is rotated through the axis of the shaft; when the fracture is *impacted*, the trochanter moves through an arc of a circle of which the head of the bone is the center, and the excursion made by the trochanter will depend upon the depth of impaction.

Another symptom referred to in the case reported, was a fulness in the upper part of Scarpa's space. This could be sometimes felt in lean patients, as a more or less bony prominence in the region of the neck, and, with the symptom of eversion, depended upon the manner of impaction.

Dr. L. A. Stimson thought the two opposing facts mentioned by Dr. Hamilton did not seriously affect his diagnosis. There were many specimens showing that repair had taken place without the formation of osteophytes; and as to eversion or limitation of inversion, that was a symptom dependent upon mechanical conditions which might or might not be present; for example, impaction with outward rotation of the shaft upon the neck. If the impaction took place, as in Dr. Hutchinson's case, without such rotation, the range of eversion and inversion would not be modified.

The occasional great difficulty of reaching a diagnosis was admitted by all. In a case recently under his own care, a fall upon the trochanter while walking, the limb was slightly adducted and inverted, shortened half an inch, and the trochanter one-third of an inch further from the median line; no pain on pressure in front of, or behind, or upon the trochanter; inability to raise the heel. Several surgeons saw the case,

but declined to make a diagnosis. The shortening increased during the next week to one inch; then Buck's extension was applied, and in due time the patient left the hospital, walking without a limp, but with three-quarters inch shortening.

In another case, sent to Bellevue from another hospital, with the diagnosis of fracture of the neck of the femur; there was inability to walk or raise the heel from the bed, and sharp pain on pressure behind the trochanter; doubtful shortening of quarter of an inch, no fullness of Scarpa's space, no pain when the limb was forcibly pressed against or pulled away from the body. The patient was left without any dressing, and in two weeks was able to walk easily with only a slight limp. He was more than fifty years old.

INDEX OF SURGICAL PROGRESS.

HARVEIAN LECTURES ON THE MODE OF DEATH FROM ACUTE INTESTINAL STRANGULATION AND CHRONIC INTESTINAL OBSTRUCTION. By THOMAS BRYANT, F. R. C. S. (Senior Surgeon to, and Lecturer on Surgery at, Guy's Hospital).

LECTURE I.—*The Mode of Death in Intestinal Strangulation and Intussusception, with reference to their Treatment.*—Hitherto it has been the custom to place cases of strangulation of the bowel amongst those of obstruction, indeed, to consider them as one of its forms; but there is, the author is convinced, in this arrangement, a grievous error; since, in strangulation of the intestine, obstruction is only one of its symptoms, but not the cause of danger or of death; whereas, in cases of intestinal obstruction, the obstruction is the prominent and dangerous feature. In proof of this, he adduces “the case of acute strangulated hernia relieved by operation or taxis, as the case may be, and in which the symptoms, however severe before its reduction, at once cease on this result being effected; although, possibly, no action of the bowels may be obtained for two or three weeks subsequently, the want of action not giving rise to any special symptoms.” He then considers the mechanism of “what is called strangulation,” and points out that both it and its effects are essentially similar, whether the case be one of internal strangulation or external (*i. e.* ordinary strangulated hernia). He refers to the phenomena of venous congestion, hæmorrhage, ulceration, gangrene, and rupture. Then follow three illustrative cases, briefly described.

What bearing should the facts related have on surgical practice? In the case of strangulated hernia, the rule is now so well recognised that, on the appearance of vomiting—from the first occurrence of which symptom the date of strangulation is calculated—“no time should be lost in the reduction of the hernia, either by taxis or herniotomy.” In a case of internal hernia, or of internal strangulation from any other cause, precisely the same rule applies. “Whether the cause of the obstruction be an internal hernia, a volvulus, or band, the mechanical condition called strangulation exists, and, unless this can be relieved, the end by death cannot be averted. To make a more special diagnosis as to the form of strangulation is not required; to wait for it, is often to wait for a *post-mortem* investigation. An exploratory abdominal operation is the only scientific surgical proceeding, and this should be undertaken as soon as a diagnosis of strangulation is made.”

With reference to the objections that may be raised against this advice, the author explains that he only suggests operative measures “in cases in which symptoms of acute intestinal strangulation, similar to those of acute external hernia, are present.” Further, he says, no prudent surgeon refrains from herniotomy because

cases of acute hernial strangulation have been known to recover spontaneously, nor should the surgeon refrain from laparotomy for acute internal strangulation because of any analogous reason. He then relates shortly, nine cases in which relief *could* have been afforded by operation (as was proved by *post-mortem* examination); and afterwards, a successful case operated on by himself. (The same case was reported in full in the *Medico-Chir. Transact.* for 1867.)

He next considers intussusception, and analyzes the notes of the necropsies of twenty cases. "Death usually occurred from either gangrene of the entering and returning layers, or perforation by ulceration of the receiving or external." Whether the form of intussusception be acute or chronic, inflammatory changes take place in the outside or receiving layer, from which the pathological records of Guy's Hospital reveal the fact that perforation or ulceration of the bowel occurs. The author next gives brief notes of a very interesting series of nine cases of intussusception. His own headings of seven of these cases run as follows:

"Intussusception of ileum; sloughing; acute peritonitis."

"Intussusception of ileum into colon; perforation of the bowel by ulceration at the neck of the entering layer; peritonitis."

"Ileo-cæcal intussusception; inflation; rupture of the peritoneal coat; extravasation; peritonitis."

"Intussusception; inflation and injection; ruptured peritoneal coat of bowel."

"Ileo-cæcal intussusception; inflation of bowel; collapse of patient; peritonitis."

"Polypoid tumors of the ileum; intussusception; acute peritonitis."

"Intussusception of diverticulum ilei; peritonitis; laparotomy."

The ages of the above cases were, respectively, forty-nine years, five months, six months, seven months, seven months, forty-two years, twenty-two years.

Of inflation, the author observes that it is "under all circumstances hazardous and dangerous, although success in exceptional cases may be recorded." In acute cases it is "hardly applicable;" in chronic cases, it should be employed, if at all, within the first three days.

In conclusion, the following rules of practice are laid down:

"1. Laparotomy should be undertaken as soon as the diagnosis of acute intestinal strangulation is made. There should be no delay allowed for the formation of a specific diagnosis of its cause. It should likewise be proposed in all cases of acute intussusception, and of chronic, which have failed within three, or, at the most, four days, to be relieved by other treatment.

2. In all operations of laparotomy it is to the cæcum that the surgeon should first advance, since it is from it he will obtain his best guide. If this be distended, he will at once know that the cause of obstruction is below; if it be found collapsed, or not tense, the obstruction must be above. Adhesions of bands are, moreover, more frequently near to, or associated with, the cæcum, than with any other part of the intestinal tract. It is also in the right iliac fossa that the collapsed small intestine, in cases of acute strangulation, is usually to be found; and,

with this as a starting point, the surgeon will have less difficulty in tracing up the intestine to the seat of strangulation, than if he begins at a distended coil, when it will be a matter of chance whether he travels away from or towards the special object of his search—the seat of obstruction.

3. In a laparotomy, when the strangulated coil of bowel is gangrenous, it should be brought out of the wound, and the gangrenous knuckle resected. The proximal and distal ends of the resected bowel should then be stitched to the edges of the wound, and an artificial anus established.

4. Nélaton's operation of enterotomy should be undertaken in all cases of intestinal strangulation, when laparotomy is rejected or seems inapplicable, as well as in cases of intussusception in which the invaginated bowel cannot readily be released. It should be performed in the right groin, or rather right iliac fossa.

5. If laparotomy succeed, the cause which called for it is removed, and the normal action of the bowel is restored. If resorted to early, and as a rule of practice, it is probable that it would be more successful than the treatment by opium, inflation, or purgatives, which has hitherto been in vogue."—*British Medical Journal*, 1884. No. 1248. November 22.

LECTURE II.—*On the Mode of Death in Intestinal Obstruction, and its Treatment.*—"A simple obstruction may destroy life; either by bringing about exhaustion due to the inability of the patient to take or retain food, the consequence of vomiting; or by peritonitis, the result of back-pressure upon the bowel above the seat of obstruction; if not more directly occasioned by sloughing, rupture or ulceration of the cœcum or colon, the consequence of over-distension. When obstruction is the result of ulceration, cancerous growth or otherwise, the disease which causes it may help to bring about a fatal result; but the changes in the bowel above the seat of obstruction are the main cause of death when these cases are left to take their natural course."

"The best examples of death from pure obstruction are those due to congenital malformations of the rectum." The author quotes five cases, in all of which death was due to peritonitis, the result of the obstruction.

With regard to the treatment of imperforate rectum or anus, the author says his cases "support the suggestion and practice of opening the bowel in the right inguinal region, since, by such an operation, the cœcum or the sigmoid flexure will thereby be opened." He regards this measure as far preferable to left lumbar colotomy in these cases, and as also preferable to any blind incision or puncture into the pelvis from an anal *cul-de-sac*.

Two cases are then related, in which "death actually took place as a direct consequence of fecal obstruction;" one a woman, aged 22, the other a child, aged 7 months. "The former died from exhaustion; the latter from peritonitis."

The author then proceeds as follows: "I will now pass on to demonstrate how, by obstruction from any cause, the cœcum or colon may slough, rupture or ulcerate as a direct result of pressure backwards. Indeed, this complication is the most

common consequence of chronic obstruction from any cause, and as a cause of death is to be counted as the most frequent. It is the general exciter of peritonitis in all cases of obstruction, and is too often the cause of death after colotomy, the operation having been performed too late. "I have before me the notes of twelve cases of stricture of the rectum, in which one or other of these complications was the direct cause of death, and the records of many others in which ulceration of the cæcum, or colon, due to extensive pressure, was found." He gives the heading of some of these cases.

He asks his medical friends, in cases of chronic obstruction, to bear in mind the probability of these ulcerative changes, and not to delay too long the resort to operative interference.

With regard to the nature of the obstruction: "At Guy's Hospital, out of 49 consecutive cases of stricture of the bowel examined on the post-mortem table, 13 were registered by the able pathologists of that institution as being of a simple character; 2, of syphilitic origin, and 34 as cancerous; or, in rough numbers, one out of every three cases had its origin in a disease other than cancer. All, however, eventually lead to obstruction, many to a narrow stricture, and some tend to occlusion.

"That one-third of the cases of stricture of the rectum or lower bowel are not cancerous is an important practical point to recognize, since it suggests the possibility of saving life, if the evil effects of obstruction can be neutralized or done away with."

Here follow notes of some cases of simple and syphilitic stricture of the rectum:

"Non-cancerous ulcerations heal after colotomy, though it may be with a narrowing, possibly occlusion, of the rectum." He gives anatomical observations in proof of this.

With regard to details of treatment: "In all cases of ulcer of the bowel, the horizontal position, the administration of such food as milk and animal broth, with farinaceous compounds—food that supplies fuel to the body, and nourishes, and at the same time leaves behind it the least irritating amount of waste to pass away—should be ordered. Large soothing and occasionally stimulating enemata, and tonic medicines, are essential. When the stage of obstruction has commenced, laxatives are required; and of these the oily forms are the most useful. An enema of olive—or castor—oil is preferable to any other. Purgatives are to be condemned, since they, by producing forced peristalsis of the bowel above the stricture or seat of obstruction, tend to do harm. Belladonna is a valuable drug, and when combined with opium gives great comfort. The use of enemata administered through the long tube is dangerous; in some cases they may give undoubted relief, but in others they cause rupture of the bowel, or perforation, and, as a result, fecal extravasation and death."

"When the stage of obstruction has been reached" the question of operative interference becomes prominent. The "question of operative interference" means,

with Mr. Bryant, practically "the question of colotomy." That after colotomy, "when the disease is not cancerous, a rapid healing of the ulcerated bowel may with confidence be expected; and should the malady be of a cancerous nature, rapid and complete relief will be given to the patient."

Three tables are given, containing altogether 82 cases of colotomy, which have all "passed through" the author's hands. The first contains 26 cancerous cases, which died within the month. They all died, according to Mr. Bryant, because they were operated on too late. He names them "Too late cases." With one exception it is recorded of them that they "sank" on such or such a day. The exception "died on the eighteenth day, suddenly, from sudden pain, collapse and ruptured spleen. No peritonitis."

The second table contains 34 cancerous cases of recovery: 9 died in six months; 7 lived from six to twelve months; 9 lived from one to five years; 1 was alive five years after; 8 "left the hospital convalescent."

The third table consists of 22 non-cancerous cases, of which 7 died within a month or thereabouts; 15 are described as having convalesced; of the fifteen, however, 1, in spite of the convalescence, died in forty days (the disease had existed for fifteen years before operation); another died in nine weeks; a third in seven weeks; and a fourth, also "convalescent," in four days. The last "died from ruptured cancerous mesenteric tumour."

Mr. Bryant's own analysis of his cases is as follows:

ANALYSIS OF THE WHOLE NUMBER OF EIGHTY-TWO CASES OF COLOTOMY.

WERE PERFORMED FOR CANCEROUS STRICTURES:—

19 were performed for stricture and ulceration of the rectum.

1 was performed for volvulus of the sigmoid flexure of the colon,

2 for obstruction due to pelvic tumours.

SIDE OPERATED UPON:—

Left lumbar colotomy was performed in 77, and right lumbar colotomy in 5, of these cases, all of the 5 being cancerous. Right lumbar colotomy was called for in 1 out of 12 cases of cancerous stricture.

DURATION OF LIFE AFTER THE OPERATION:—

26, or 43 per cent. of the cancerous, and 6, or 31.5 per cent. of the non-cancerous cases, with one of the cases operated upon for obstruction, or 40 per cent. of the whole number of 82 cases operated upon, died within the month.

34, or 56 per cent. of the cancerous, and 13, or 68.5 per cent. of non-cancerous cases, with the case of volvulus and one of the cases of obstruction, or 60 per cent. of the whole number of cases operated upon, received, more or less fully, the benefit of the operation.

OF THE FORTY-NINE SUCCESSFUL CASES:—

16 cases, 9 cancerous and 7 non-cancerous, died within 6 months.

8 " 7 " 1 " lived from 6 to 12 months.

12 " 9 " 3 " lived from 1 to 5½ years.

5 " 1 " 4 " were alive from 1½ to 14 years after operation.

8 " 8 " had left the hospital convalescent.

49 34 15

SEX:—

Of the 60 cancerous cases; 40 were in males, 20 in females.

" 19 non-cancerous: 10 " 9 "

" 1 case of volvulus: 1 was in male.

" 2 cases of obstruction: 1 " 1 in female.

Of the 82 52 were in males, 30 in females.

Cancerous stricture is more frequent in males. Non-cancerous stricture is found equally in both sexes.

AGE:—

The average age of the cancerous cases,

When fatal was 53: in male subjects, 54; in female, 51.

" successful, 44: " 46; 41.

The average age of the successful being about 10 years less than that of the fatal cases.

No abnormality as to the position of the colon was met with in any of the 82 cases.

With regard to the operation itself, and particularly to the best way of guarding against the passage of the feces past the lumbar opening into the rectum, the author describes a plan which he has carried out in two cases, and is highly satisfied with: "I divided the muscles freely down to the lumbar fascia, and then, having twisted all the bleeding vessels, divided it, and exposed the bowel. I easily separated it from its connective tissue attachments, and by so doing allowed it to project well from the wound."

"Having done this, I made sufficient traction upon its pelvic end to enable me to bring outside the deep orifice of the wound a complete knuckle of intestine, with its outer surface on a level with the skin-wound. This I left *in situ*, and simply protected it with a piece of lint covered with vaseline, over this some iodoform-gauze, and, outside, a mass of Gamgee-tissue. I then applied a broad bandage to the abdomen, conveying its ends above and below, but not over, the lumbar incision." Mr. Bryant uses no sutures, and opened the bowel on the fourth day in one case, on the fifth day in the other.—*Ibid*, No. 1249, Dec. 6.

III. OBSERVATIONS IN ONE HUNDRED AND THIRTY-SEVEN ABDOMINAL SECTIONS. By R. S. SUTTON, M. D., LL. D. Of the cases upon which these observations are founded, twenty-nine were done by Dr. Sutton, the remainder by various operators of all countries. They comprise McDowell's, Battley's, and Tait's, and Hegar's operations on the ovaries and tubes; cholecystotomy; supravaginal hysterectomy; resection of the pylorus; resection of portions of the bladder-wall, and of the small intestine. Speaking of ovariectomy, it is observed that nearly all cases of ovarian cystomata recover if operated on early, under proper precautions, because nearly every young ovarian tumor is free from adhesions, easy and simple of removal, and thus not dangerous. A very large number of cases of ovarian cystomata die, if operated on after frequent tapplings, after long delay, in their own homes, under ordinary precautions, because the long delay has developed adhesions, neurasthenia, brown atrophy of the heart, and kidney disease. Simple cases, and a well regulated special institution for the work, will always be the main-spring of success in McDowell's operation. Age is not a barrier to ovariectomy done early. The Tait-Hegar operation for removal of ovaries and tubes depends largely on the existence or non-existence of adhesions for the ease or difficulty of its performance. After the operation, the most important point is to leave the peritoneal cavity dry. Resection of intestine may be undertaken with fair prospect of success. Climatic influences seem to have little to do with results in abdominal surgery, provided that an abundant supply of pure air, hot or cold, can be provided for the patient. If we will "wash and be clean," even to the minutest details, spray may be dispensed with. Fewer spectators should be allowed, and

one, or at the most two assistants employed. Prevention of loss of blood stands next in importance to having the peritoneal cavity dry. In McDowell's operation, the most successful method of treating the pedicle has been by Baker Brown's clamp and cautery in the hands of Keith. Ligation and division of the pedicle with Paquelin's cautery, ligation and division of the pedicle with knife or scissors, are both established methods. The intra-peritoneal method of treating the pedicle is best.

Supravaginal hysterectomy gives good results, but there is much difference of opinion regarding its details. In this operation, the extra-peritoneal treatment of the pedicle has given the best results. Koeberle's *serre-nœud* is generally preferred, being placed beneath a pin passed through the cervix at right angles, resting across the wound when closed. The best super-dressing is iodoform gauze.

Drainage in intra-abdominal operations should be resorted to only in cases where it is not certain that bleeding is arrested, when many adhesions were divided without the cautery, and when the peritoneum is so irritated that it is almost certain to throw off much serum. Drainage-tubes, during the first twenty-four hours, create but little, if any, irritation; but after this time expires, they are constant sources of danger if left.

Excision of the pylorus is not established as an advisable operation, the disease being almost sure to return elsewhere. Wölfler's operation of uniting the stomach and duodenum by new openings, will probably give as much relief as resection of the pylorus. Dilating the pyloric orifice for stricture through an opening made in the stomach, and gastrotomy for foreign bodies, are both good and feasible operations. The best suture in these operations, as well as enterotomy, is silk, well scalded or boiled, either in plain water or a one to twenty solution of carbolic acid. In uniting intestine or stomach, the sutures should not include the mucous membrane, and should be fortified with a second row, including only peritoneum, after the manner of Czerny and Lambert. Sponges are to some objectionable. Wet instruments are cleanly. Koeberle's hemostatic forceps are the best. For closing abdominal wounds, straight, smooth, well-pointed needles are preferable; for intestinal wounds, a curved needle without cutting-edge. Silk is the best suture to leave in the abdominal cavity, but inferior to silk-worm gut, used wet, for the abdominal wound. The latter suture may be left in the tissues indefinitely.

The writer's own methods are summarized as follows: The room has scanty furniture and bare floor. The walls, floor and furniture are washed with soap and water, and wet with mercuric bichloride, 1-2000. Instruments are scalded, cleaned with soap and water; rescalded, dried, put in alcohol and dried again. Each forceps, tenaculum and needle is passed through the flame of an alcohol lamp, put in clean brass pans, and covered with a clean cloth. Sponges are taken from a five per cent. solution of carbolic acid in which they have been seven days. The patient having previously had a purgation, receives, on the morning of the operation, a complete bath, a hot vaginal douche, clean clothes, and is put into a clean bed

next to the operating room. The two nurses who assist take a bath and dress in fresh clothes. The operator and assistant do the same. Just before beginning the operation, hands are washed in turpentine, then with soap and water. Spectators limited to patient's physician and two others. Patient placed on the table with can of hot water at her feet; abdomen, chest and extremities covered with rubber sheet, exposing only the side of operation, which is rubbed off with a wet carbolized towel. The instruments lie in a bath of hot water. The sponges steam in a double bucket. When drainage-tube is used, it is of glass and reaches to the bottom of the pelvis. Its mouth is secured by a sponge, confined by a rubber sheet, perforated by the tube, and folded around the sponge. The tube is frequently examined and emptied by suction, and a little iodoform dropped in it. The tube does not stay in long. He cares little about a diagnosis, simply looking out for pregnancy, renal and cardiac disease, and leaving the character of the growth to be determined on the operating table.—*Medical News*, 1884. Vol. XLV. No. 18. November 1.

IV. TWO PENETRATING SHOT-WOUNDS OF THE ABDOMEN. RECOVERY WITHOUT OPERATION. By EDMUND ANDREWS, M. D., LL. D. Case I. A boy of sixteen, with empty stomach, was shot squarely in front with a 22 cal. pistol, the bullet striking the linea alba about an inch above the umbilicus, and the probe passed freely into the abdominal cavity. The treatment consisted of strict starvation and opiates. The bullet passed, per anum, in a week. Recovery without an untoward symptom.

Case II. A young man of twenty-two, who had been drinking beer freely, was shot by a policeman's pistol, cal. 38. The bullet struck him behind in the right loin, near the eleventh rib, and passed through him, emerging at the linea alba, half-way between the umbilicus and the xiphoid cartilage. A probe passed into the abdominal cavity with ease. There was vomiting of blood mixed with beer. Judging that there was perforation of the stomach, opening of the abdomen was proposed, but the patient would not consent. Treatment, therefore, was starvation and opium. Recovery without a bad symptom.

In commenting on these reports, Dr. Andrews, while admitting the importance of exploratory incisions in proper cases, does not believe that they hold out the only hope of life, especially when the injury is inflicted upon the stomach, and by a projectile of small calibre. The thick muscular walls, and loose voluminous mucous membrane of that organ, are prone to close up and contract around the track of a small bullet. The summary is as follows:

1. Penetrating wounds of the abdomen, made by musket shots, have a mortality of at least four-fifths when not operated on. In military practice, a large part of these cases should be treated by abdominal section.

2. In abdominal wounds from smaller projectiles, the risk is less, but if the bullet seems from its direction to have traversed the intestines, the treatment should be the same.

3. If no intestinal wound should be discovered, the operation may nevertheless be of the greatest benefit, if done promptly, by enabling the surgeon to ligate bleeding vessels, as shown by the experiments of Dr. C. T. Parkes.—*The Weekly Medical Review*, 1884. Vol. X. No. 22.

V. THE LIBERATING OF THE RING FINGER, IN MUSICIANS, BY DIVIDING THE ACCESSORY TENDONS OF THE EXTENSOR COMMUNIS DIGITORUM MUSCLE. By WM. S. FORBES, M. D. (Read November 12, 1884.) When the middle finger and the ring finger are brought down by the flexor muscles, and their balls are held down firmly against the keys of a musical instrument, as in performing on a piano, for the purpose of producing continuous sounds, and at the same time it should be necessary to extend and then to flex the ring finger in order to produce accompanying sounds, it will be found that in the still flexed position of the middle and little fingers the ring finger can be but very slightly extended. Its complete extension, without operative interference, can only be brought about by long-continued exertion in practice, when elongation of certain accessory, but restricting, tendons is made by nutritive change.

In the dorsal aspect of the metacarpal zone in man, dissection shows that the tendon of the extensor communis digitorum muscle that goes to the ring finger gives off a slip on either side, one of which goes to join the extensor tendon of the middle finger and the other to join the extensor tendon of the little finger. These two slips are known as the lateral vincula or *accessory* tendons. Now, while the middle and little fingers are held in a flexed position, these accessory tendons, by virtue of their attached extremities, hold in check the extending power of the muscular fibres operating upon the tendon of the ring finger, and thus this finger is restricted in its function of extension to a very limited degree.

These accessory tendons are sometimes found in one hand and not in the other. They exist more frequently in the right hand than in the left. Now and then the extensor tendon of the ring finger splits at the point of departure of the accessory slips and then reuniting leaves a button-hole appearance, and again these accessory slips are entirely absent.

Since 1857 the author has divided these accessory tendons by subcutaneous incision for the purpose of liberating the ring finger in fourteen persons, and in nine of these the operation was performed on the tendons of both hands at one sitting. In not one of them did any accident follow the operation. A slight swelling of the parts remains for less than a week. The operation does not lessen in the least the power of the common extensor muscle to extend the neighboring fingers, and the power of the extensor tendon going to the ring finger is left unimpaired. The immediate result is to increase by an inch the range through which the ball of the ring finger can be elevated from the plane of the hand, and to greatly extend and facilitate the use of this finger on the keys of a piano.—*Proceedings of the Philadelphia County Medical Society*, 1884.

REVIEWS OF BOOKS.

CLINICAL AND PATHOLOGICAL OBSERVATIONS ON TUMOURS OF THE OVARY, FALLOPIAN TUBE AND BROAD LIGAMENT. BY ALBAN H. G. DORAN, F.R.C.S.; Assistant Surgeon to the Samaritan Hospital, London. London: Smith, Elder & Co., 1884.

Mr. Doran's primary object in the pages of this volume is a consideration of the tumours connected with the appendages of the uterus, and in a concise and able manner he has presented, in a digested form, the experiences and teachings of the Samaritan Hospital for Women in London. At the same time he has expressed many views which may be regarded as original. The substance of some of these ideas has been previously made public in papers read before various medical societies. At the onset we may state that the volume is to be regarded as a valuable addition to existing ovarian literature, and a book that will strengthen and enhance the reputation of the author as a scientific investigator. It consists of twelve chapters, which contain reports of many valuable clinical cases, and also various illustrations, some drawn by Mr. Doran himself, and others by Berjean; these are clear and intelligible.

Chapter I. deals with the common multilocular ovarian cyst. Reasons are given for believing that such a cyst is due to retrograde changes in the graafian follicles that have never been developed into the corpora lutea of menstruation and pregnancy. Under the heading of multilocular and glandular ovarian cysts, fused cysts are described, and the facts significantly pointed out that, in these cases, which are often very troublesome to the operator, one pedicle is generally treated as an adhesion. Five cases of this kind, that have come under the writer's own observation, are detailed.

Chapter III. deals with the parovarium and its relation to cystic disease of the broad ligament. It is with satisfaction that we note that Mr. Doran clearly emphasizes the fact that "the most frequent form of broad ligament cyst is, at least, not invariably of parovarian origin," and that some so called parovarian cysts spring from the situm of the ovary. In the treatment of these cystomata, tapping is deprecated, although it is admitted that broad ligament cysts are often curable by this simple procedure. Of course the difficulty to be surmounted is to make an exact and correct diagnosis. Abdominal sections not infrequently clear up a great many of the fallacies of diagnosis evoked by a

belly intact; at the same time, if properly performed, it is not a very serious operative measure.

An interesting and instructive chapter is one considering papillomata and sessile ovarian cysts. From personal observation the fact is pointed out that the small papillomata found in foetal ovaries are similar to those present in matured adult ovarian cysts. Moreover, it is suggested that the relation of the stroma to the follicle and graafian bodies is not identically the same in women and the lower animals so that any evidence forthcoming must be based upon the examination of human ovaries. Of dermoid cysts the author's observations are founded on thirty-two cases, the oldest patient being sixty-three years of age, and the youngest fourteen; in seven of these instances the cyst was double. Attention is directed to the occurrence of malignant neoplasms in the cavity of the cyst, and two examples are given.

In the chapter devoted to solid tumours of the ovary, generally sarcomatous, a case of carcinoma is mentioned as having been met with. We quite agree with Mr. Doran that abdominal section is justifiable as a method of diagnosis, but we question if the actual removal of the growth does much to prolong the life of the patient, although it takes away for a time some of the inconveniences caused by a tumour in the abdomen. The subject of twisted pedicle is well discussed, and the theory, originating, we believe, with Mr. Lawson Tait, that the condition is due to the passing of fæces along the rectum, is noted, but it is thought more probable that the rotation is brought about by the frequent changes in position of the patient.

In the pages devoted to the practical consideration of adhesions and the wound made in the abdominal parietes, Mr. Doran's inclination decidedly tends towards a long incision. Doubtless at the time of the operation a large aperture simplifies manipulation, but the chances of hernial protrusion are thereby increased, and probably lead to much subsequent discomfort. A small incision permits the operator to ascertain first what pathological condition has to be dealt with; if insufficient for the demands of the case, enlargement is readily effected without in any way interfering with the healing afterwards. The intraperitoneal method of securing the pedicle is of course advocated, and attention is drawn to the little thrombus often noticed when the ligature has been secured. Both the author and Mr. Thornton advocated a moderate tightening of the pedicle ligature, as opposed to Sir Spencer Wells' very forcible compression. As a method of practice both ways seem to answer equally well. The cases recorded of unfavorable changes in the ligatured pedicles are very instructive.

The chapter on Fallopian tube tumours is disappointing. Pyo-salpinx and hydro-salpinx so often occur, and are so satisfactorily deal

with, that we should have liked to have seen them considered by so able a pathologist as Mr. Doran.

In conclusion we may state that we have no doubt that the book will be read with interest by all, and that the majority of thoughtful readers will profit by its perusal.

T. F. CHAVASSE.

MEDICO-CHIRURGICAL TRANSACTIONS, published by the ROYAL MEDICAL AND CHIRURGICAL SOCIETY of London. Second series, volume the forty-ninth. London: Longmans, Green & Co., 1884.

The Transactions of the Royal Medical and Chirurgical Society have a well-known character of their own. They consist of essays, each of which has usually been the subject of considerable elaboration and of a far greater expenditure of time and labor than is usually devoted to the preparation of papers read at the other London societies. It is also well understood that these Transactions, like those of the Royal Society itself, are more or less select, only papers of a certain standard being admitted into them.

As an excellent illustration of the foregoing remarks, we may cite the first surgical paper in the present volume. It is entitled "Case of Spontaneous Inguinal Aneurism in a boy, aged twelve years; for which the external iliac artery was tied. With a table of all the other recorded cases of external aneurism in persons under twenty years of age. By Robert William Parker, M. R. C. S., Eng., surgeon to the East London Hospital for children (pp. 51-67)." Mr. Parker first recites the case, one of remarkable interest, very accurately and minutely observed, and including pulse-tracings as well as wood-cuts of the pathological specimen. Then follows a table in which the author has arranged all the cases of extracranial spontaneous aneurism occurring in subjects under twenty years of age, of which he could find original records, and, as some of these records are not within easy reach, he has added to the table a brief abstract of the notes of each case. By the light of this table and of the detailed account of his own case, Mr. Parker is able to present an interesting study of the ætiology of the affection. At the first glance the table shows the frequency with which valvular disease of the heart is coexistent. Of the fifteen tabulated cases in two cases only is the heart stated to have been healthy. The frequency of the association largely strengthens the view that embolism stands in some etiological relation to aneurism.

The author now notices, one by one, the chief contributions to British literature bearing on the relations of embolism to aneurism. With the aid of Dr. Church's monograph in the sixth volume of St. Bartholomew's Hospital Reports, he deduces collateral evidence from

the pathology of intracranial aneurisms in early life. (Of thirteen such cases, in seven the heart was diseased, in six there were vegetations on the valves, in four the heart's condition was not mentioned, and in all the arteries were free from atheroma or other disease.)

Accepting as proved the theory that embolism leads to these aneurisms, he next discourses *how* it does so, at the same time citing and criticising the explanations suggested by Shaw, Joliffe, Tufnell, Goodhart, Church and Ponfick. Finally the author states his own view.

This useful and interesting paper is a type of the contents of the whole volume.

Most, if not all, of the other surgical contributions have been noticed in the résumé of surgical work in Great Britain during 1884, given in our number for January. They include Mr. Jonathan Hutchison "On High Amputation for Senile Gangrene," communications by Dr. F. H. Champneys, "On Artificial Respiration in Still-born Children (Mediastinal Emphysema and Pneumothorax in connection with Tracheotomy. An experimental inquiry). Mr. Treves, on "the Direct Treatment of Psoas Abscess with Caries of the Spine;" Mr. Whitehead, on "Radical Cure of a large Spina Bifida in an adult;" Dr. T. F. Chavasse, on "Neurectomy of the Second Division of the Fifth Nerve;" Messrs. Cayley, Pearce Gould, and Biss's papers on the operative treatment of pulmonary diseases; and Mr. Arbuthnot Lane's on "Three Forms of Spinal Deformity." Among the medical papers also are some of great general interest, especially the contributions of Drs. Ferrier and Sharkey to the literature of "cerebral localization."

C. B. KEETLEY.

HENKE'S ATLAS OF SURGICAL ANATOMY. A series of plates illustrating the application of anatomy to medicine and surgery. Translated and edited by W. A. ROTHACKER, M. D. Cincinnati, A. E. Wilde & Co.

FROZEN SECTIONS OF A CHILD. By THOMAS DWIGHT, M. D. Fifteen drawings from nature by H. P. Quincy, M. D. New York: William Wood and Company.

The first of these recently published collections of anatomical illustrations is an American reproduction of a German atlas. The publishers have supplied all the typographical accessories required to make it acceptable to the profession. The paper is excellent, the printing is well done, the size of the book is convenient. The real value of the book must depend, however, upon the choice of the regions that have been chosen for illustration, and the clearness and accuracy with which the drawings have been made. The work consists of eighty-one plates, comprising one hundred and twenty-one different figures. Of these the

first seventeen plates are devoted to the head and neck; then follow eight for the thorax and its contents; fourteen for the upper extremity; eleven for the abdomen and its contents; ten for the pelvis and genital organs; and, finally, twenty-one for the lower extremity. Upon turning to the individual plates, in the first one, which is a clearly outlined, somewhat diagrammatic representation of a vertical section of the head and neck through the median line, attention is arrested at once by the peculiar relations of conjunction which are being enjoyed by the uvula and the epiglottis, a condition which certainly is grossly inaccurate and misleading. Further examination shows that this is due to an exaggeration of the epiglottis at the expense of the tongue—*ex uno disce omnes*. The figures which are devoted to sections of the brain and of the various regions of the head are not satisfactory, either as to their fullness of detail, or the accuracy with which the proportions and relations of the parts are represented. In the absence of any descriptive text, most of them can be of but little use to a general reader, and certainly of still less to the surgeon. They are no larger in size, nor in general so accurate as those to be found in the ordinary anatomical text-books. Plate XII., fig. 2, and plate XVII., figs. 1 and 2, are devoted to the median region of the neck, anterior to the trachea. In the first of these the head is strongly drawn back. A very marked elongation of the anterior bellies of the digastric muscles is shown, with a tense thyrohyoid membrane, while the larynx and trachea remain in the same relation as is exhibited in the second and third figures, where the head has been brought forward again to the perpendicular. Other inaccuracies and inconsistencies might be described as present in these figures, but it would only occupy unnecessary space and fatigue the reader. It would be unprofitable to take up the various figures, plates, or even groups seriatim. They will not satisfy the demands of any use, other than as sketchy diagrams, which do not pretend to accuracy of detail. The editor, in his preface, says: "We have, in our language, text-books of anatomy, and we have atlases of anatomy, but we have nothing which will show us at a glance the topographical anatomy of the human body: in other words, anatomy, as we view it, in relation to surgical operations, medical diagrams, post-mortem examinations, etc. Strange to say, that, while France and Germany have produced works without number on applied anatomy, America has done almost nothing in this direction." If this be true, it is to be regretted that the editor should not have chosen from the foreign works at his command one that might have more fully answered the needs which he describes.

The book of Professor Dwight consists of fifteen plates representing successive transverse sections at regular intervals through the body

of a girl of three years of age, the first cut passing through the body of the sixth cervical vertebra, and the last just below the symphysis in front, missing by a very little the tip of the coccyx behind. These are accompanied with explanatory text, in which attention is drawn to the chief points that are illustrated in the sections, together with more comprehensive discussions of the relations which a comparison and a collection of several sections demonstrate to exist in the more important organs. Many of these are of importance as well to the surgeon as to the physician. Indeed the work is evidently not intended as a student's text book, nor would it be of any value to any one who was not already familiar with human anatomy, as generally studied.

It is a contribution to topographical anatomy, of more value than its title would at first suggest; for, as mentioned by the author in his preface, it may serve for the study of adult relations also, owing to the careful and clear manner in which the peculiarities due to the age of the subject are discussed in the text.

The plates are of life-size, and this has been possible without making the book of inconvenient size, owing to the age of the child from whom the sections were obtained. It will be impossible to notice even a majority of the practical and suggestive statements with which the text abounds; a few examples must suffice. Not least in importance is the author's remark, in connection with a discussion of the relative proportions of the different regions of the spinal column at various ages, attending the description of Plate I., that "the shortness of the neck in infancy does not depend on that of the cervical region of the spine, but on the largeness of the head, the high position of the sternum, and the abundance of fat." Any one who has had frequent occasion to perform tracheotomy upon young children will be able to corroborate out of his own experience that the shortness of the infantile neck is more apparent than real, for increasing age by no means increases proportionately the area of the operative field. Again, in connection with the relations of the pleura to the twelfth rib, a locality of increasing surgical importance, owing to the greater frequency with which operations by the lumbar incision upon the kidneys are being recognized as necessary, he calls attention to the variability of these ribs in length, and of the ease with which in certain cases the eleventh rib may be mistaken for the twelfth, while the pleura, nevertheless, descends as far as usual, although the twelfth is wanting or but slightly developed. The author omits to state, however, what is of equal importance, that the extent to which the pleura descends is also variable, so that, though that membrane may most frequently reach down to the upper border of the last rib, it is by no means always the case.

The views of the stomach are very instructive. They confirm the

observations of others that the fundus points upwards, and that the lesser curvature is essentially vertical. Certainly five-sixths of the stomach are on the left of the median line.

The section through the lower end of the movable portion of the spinal column gives the author opportunity to make certain observations upon its curves, in the course of which the views of Ballandin, as to the agency of the mutual antagonism of the great erector muscles of the back and the short and strong ilio-femoral ligament in producing them, are quoted with approval.

In connection with the fifteenth and last plate, the rectum comes under consideration. The much disputed third sphincter is very summarily dismissed as "of little consequence, and not deserving the attention it has received." The possibility of the introduction of the surgeon's hand into the rectum for purpose of diagnosis is mentioned, coupled with the statement that such introduction had much better not be done unless the information to be gained is of sufficient value to justify risking the patient's life to obtain it.

We close the book with the conviction that it is a contribution to anatomical literature of great practical value. Its method is in the line of every day use rather than of transcendental science, and for that reason will command the interest of a larger number of readers.

L. S. PILCHER.

OSTEOTOMY AND OSTEOCLASIS FOR DEFORMITIES OF THE LOWER EXTREMITIES. By CHAS. T. POORE, M. D., Surgeon to St. Mary's Free Hospital for Children, New York, Member of the New York Surgical Society, etc. D. Appleton & Co., New York. 1884. 8 vo., pp. 187.

The author of the work here presented is known as a conscientious, painstaking writer, and his contributions to literature, whether of a surgical or neurological nature, have always taken high rank among compilers of text-books and volumes of reference. He is one of the few who know how to state a fact, and how to discriminate between a fact and an opinion. One can readily find the two standing out in bold relief in all that Dr. Poore ever writes.

Students in medicine and searchers after surgical truth were, therefore, pleased when the Appletons announced a book on osteotomy by a gentleman so well and so favorably known in this department of surgery.

This is the first book written by an American on a subject which has engrossed the minds of surgeons during the past five or six years. One familiar with Macewen's Osteotomy naturally asked the question:

What can Dr. Poore say that is not already said by the distinguished Glasgow surgeon?

Our author, in his preface, tells us that he "has had considerable experience, both in the mechanical and the operative treatment of the deformities considered in this book," and that there can be no doubt that a concise treatise on osteotomy is wanted, "one in which the methods of operating and the management of the wound and limb after section are considered." A reference to the table of contents will convince one that the claim for conciseness is well established, for we find ten chapters, the captions of which and the pages covered are as follows:

I. The relation between rickets and certain deformities of the lower limbs, occupying ten pages; II. Osteotomy treated in a general way in nineteen pages; III. Osteotomy for deformities at the hip joint, extending over forty pages; IV. Genu valgum; its etiology and pathology, twenty-four pages; V. Osteotomy for genu valgum, thirty-three pages; VI. Genu varum, only three pages; VII. Osteotomy for ankylosis of the knee joint, six pages; VIII. Osteotomy for tibial curves, thirteen pages; IX. Osteoclasis, twenty-one pages; and X. Statistics after Osteotomies, concluding the remaining five pages of reading matter. There is added a comprehensive bibliography, and a fair index.

A reference to Macewen's work will show that the same ground is covered.

The reader who is desirous of finding support for the spontaneous cure of bent bones in either of the volumes will be disappointed. In the last paragraph of Dr. Poore's first chapter he states: "I am not a believer in the spontaneous cure of bending of the long bones. We often hear the advice given to mothers by members of the profession not to submit these case to treatment, that the child will 'outgrow' the malposition; and I wish to enter my protest against such advice, as it will only lead to disappointment." This opinion is here given as an opinion, and the reviewer calls attention to the absence of any proof save on theoretical grounds. The management of the wound is very simple, and since our author adopted this plan his results have been "eminently successful." In sixty linear osteotomies, in all but three cases the wound was united on the third day.

The most interesting and perhaps the most instructive chapter is the one on deformities of the hip. The best position for an ankylosed hip, in Dr. Poore's opinion, is when the thigh forms an angle of 125° with the transverse plane of the pelvis. This is certainly not the angle aimed at in the employment of orthopedic appliances. The conclusions reached, however, depend on certain premises which many of us are not prepared to admit. The writer of this review finds patients complaining more of a limb best suited for sitting than one best suited for standing

or walking. In the upper walks of life the aim is to stand erect and have the limbs parallel; any departure from which standard is considered in society a deformity quite noticeable.

The different operators, the mode of operating and a review of the relative writers of the same, are freely detailed, and this portion of the book is, therefore, specially valuable. The statistics here given will, I am sure, be fully appreciated.

The only two recorded post-mortem examinations after an osteotomy at the upper end of the femur have been incorporated into this chapter, and our author has spared no labor in securing full particulars from Drs. E. M. Moore and H. R. Wharton, the gentlemen in whose practice the cases occurred.

In operating for the relief of genu valgum, Dr. Poore wisely adopts the supracondyloid method, making, however, his incision "down on the ridge of bone running from the tubercle for the attachment of the tendon of the adductor magnus to the linea aspera, at a point a finger's breadth above a line drawn from the lip of the external condyle."

Macewen directs that the incision in soft parts should be made "on the inner side of the limb, at a point where the two following lines bisect one another; a line drawn a finger-breadth above the level of the upper border of the external condyle, and a line drawn parallel to and half an inch in front of the tendon of the adductor magnus."

Dr. Poore has his limb flexed at the knee in operating, and claims for this position a greater facility in finding the ridge of bone over which the incision is made. The other differences relate to Listerism and the management of the wound and limb after operation. Our author does not employ Listerism.

Osteoclasis is not recommended with much enthusiasm, and yet one can learn of the latest osteoclasis. Altogether, the book will well repay one interested in the general subject of osteotomy.

V. P. GIBNEY.

DIE WALDWOLLE ALS ANTISEPTISCHES VERBAND-MATERIAL. VON DR. H. KUEMMELL, Oberarzt den Chirurg. Abth. des Marien-Krankenhauses zu Hamburg (Forest-wool as an Antiseptic Dressing. By Dr. H. Kümmell, Director of the Surgical Division of the Marien Hospital in Hamburg). Reprint from *Deutschen Med. Wochenschrift*, 1884. 8 vo., pp. 13.

In this address, delivered the 10th of June, before the Hamburg Medical Society, Kümmell gives his experience with some of the more recent innovations in wound-antisepsis. After recalling the long row of agents, from carbolic acid to sublimate, which have one after another

been recommended as antiseptics, he concludes that it is not so much WHAT as HOW; that it is not the antiseptic which helps to heal the wound, but the antiseptics; the most scrupulous and systematic cleanliness, backed, when necessary, by disinfectants. While we may succeed in doing away with their use about wounds, they will still be needed for a variety of purposes, as the preservation of sponges, catgut, etc. Bichloride, in 0.1 per cent solution, he considers at present the cheapest and best.

The emphasis formerly laid on the dressing material is now turned in another direction—to the primary disinfection and the strictest antiseptics before and during the operation. Almost any material, having some degree of softness and absorbent power, might be utilized as a dressing. With disinfected hay, sea-grass and charpie he has had equally favorable results as with the inorganic sand, glass and ashes preparations formerly advocated by him.

For a year now he has been using forest-wool, made from needles of the pine and fir. This material is much used for mattresses, etc., in Germany, where it costs some \$4.25 per hundred-weight. He thinks too much stress has been laid on the absorbent power of different dressings. Nearly every material with long fiber and that is reasonably soft is entirely adequate to the absorption of wound-secretions, provided before using we dip it in a fluid and then press it out thoroughly.

The absorption and removal of wound-secretions is not done by the capillaries which the material may contain, but by the fine spaces between the parts of fibre. Moreover, at the present day wounds heal with very little secretion—or, in those cases where they do not, the bandage is removed before it is saturated. Even ashes answer in this respect, and their absorbent power is relatively low.

The forest-wool is taken just as it comes from the factory, and sewed into sacks of likewise unprepared muslin. These cushions are kept in glass boxes. When wanted for use they are put into hot water for a short time, and then well squeezed out. From experiments, he has found that it is not necessary to treat these cushions with sublimate, as was the custom. Those thus treated just as often developed bacteria in meat infusion—peptone—gelatine as the fresh material. Only now and then in either case did micro-organisms develop, and these belonged to the harmless varieties. He adds that to insure the aseptic qualities of the sacks, one can pour water of about 80° to 90° C. over them some ten to fifteen minutes before use. When cool enough, press out and apply to the wound. This procedure sets free resinous matters and ethereal oils, and it is thus, according to K., that the hot water bath disinfects rather than by direct action.

Loose forest-wool may also be applied directly to a wound, or to fill

in where needed, and is very useful, when moistened, in dispensary practice. In rooms where there are a large number of patients, with this dressing the air becomes charged with the pleasant fruity odor. He speaks further in favor of Neuber's method of treating wounds without drainage, or with as little as possible.

He mounts his catgut, first moistened with 0.1 per cent sublimate solution, on rollers, lays these in the said solution for six hours, and then preserves in pure rectified spirit. He recommends testing it in sterilized blood-serum, or other suitable material, that we may know better what to blame, and what not, where suppuration ensues.

WM. BROWNING.

A STATISTICAL CONTRIBUTION TO CEREBRAL
SURGERY.

By R. W. AMIDON, A. M., M. D.,

OF NEW YORK.

AT the close of a paper¹ read before the New York Academy of Medicine, June 5th, 1884, and published in the *Medical News* of June 21st, 1884, when enumerating what I consider good indications for opening the skull, I took occasion to say: "Finally, accessible neoplasms of the brain, which have resisted medicinal treatment, and which continue to grow and threaten life, should be removed; for the reason that they are generally single, seldom have secondary deposits, are surrounded by an inflammatory zone of demarcation, and *always* kill by pressure."

At that time, and since, I have been credited with holding and advancing more radical views, and advising more heroic procedures, than the present state of our science would warrant.

Continued investigation and thought upon the subject have not shaken, but rather confirmed, my former views.

Continued study has convinced me still more of the tolerance of the brain, of the harmlessness of trephining, of the frequent harmfulness of the neglect to trephine, of our increased ability to diagnose the site and nature of cerebral lesions, and the consequent proper selection of cases.

¹ "A Plea for more Heroic Surgical Interference in Affections of the Brain."
The Medical News. Philadelphia, June 21, 1884.

Now, within seven months of the time I ventured the assertion that some kinds of cerebral tumors should be excised, comes the news from England, that an eminent neurologist, guiding the hand of a skillful surgeon, has removed a previously diagnosed tumor of the brain. The case is of such extraordinary importance and interest that I will reproduce, almost entire, the preliminary report submitted by the authors.¹

Some weeks ago a young man, aged twenty-five, consulted Dr. Bennett, complaining of paralysis of the left arm. Four years before he received a blow on the left side of the head from a piece of timber. He remained well for a year, with the exception of occasional headaches, when, for the first time, he began to experience slight twitchings in the left side of his face and tongue. These gradually became more pronounced, and occurred paroxysmally at irregular intervals. Soon afterwards he was seized with a "fit," which began with a sensation in the left side of the face and tongue, running down the left side of the neck to the arm and leg, and culminating in general convulsions and loss of consciousness. For two and a half years he was subject to daily recurrences of these paroxysmal twitchings in the left side of the face without loss of consciousness, and to the more severe general convulsive seizures with loss of consciousness, which occurred on an average about once a month. Six months ago, for the first time, he was attacked with spasmodic twitchings of the left hand and arm, and these continued daily to alternate with the twitching of the face, the two rarely occurring at the same time. Since the affection of the arm began there has been no recurrence of the general convulsive seizures with loss of consciousness. Shortly after, weakness of the left hand was observed which increased slowly. Later, twitching appeared in the left leg and eyelid; and later still, the left lower extremity became paretic. On examination, there was found to be tenderness on firm pressure in the upper parietal region, a little to the right of the median line. There was well-marked double optic neuritis, most marked on the right side; the vision was normal. There was slight comparative immobility of the left side of the face. The tongue deviated slightly to the left. Acuity of hearing diminished on right side. There was complete paralysis of the left fingers and wrist, very limited movements of the elbow, and at the shoulder these were greatly impaired. The left lower extremity was weaker than the right, and although the patient could walk, he did so with a limp, and swinging his left leg, as he could

¹Bennett and Godlee. Excision of a Tumor from the Brain. *Lancet*, Dec. 20, 1884. p. 1090.

not clear the toes from the ground. The mechanical irritability of the muscles, the knee-jerk, and the ankle clonus were most marked on the left side. Sensibility was normal and there was no wasting.

While under observation, the patient suffered from violent paroxysms of lancinating pain in the head, which at times rendered him nearly delirious. He also was seized with attacks of uncontrollable vomiting, which sometimes continued for days together and prevented his taking nourishment. The twitchings, which occurred many times a day without loss of consciousness, were also noted. These usually began in the fingers and thumb of the left hand, and consisted of rapid rhythmical movements lasting for a minute or two. These were sometimes confined to the arm alone, and sometimes to the face alone. Occasionally they began in the face, and from there extended to the arm, and down the leg of the same side. They were never observed in the leg alone.

Dr. Bennett concluded: First, that there was a tumor in the brain; secondly, that this growth involved the cortical substance; thirdly, that it was probably of limited size, as it had destroyed the centres presiding over the hand, and only caused irritation without paralysis of the centres of the leg, face, and eyelids which surround it; and fourthly, that it was situated in the neighborhood of the upper third of the fissure of Rolando.

November 25, Mr. Godlee trephined over the supposed tumor. The ascending frontal convolution, however, seemed to be somewhat distended. An incision about an inch long was made into the gray matter in the direction of the blood-vessels, and a quarter of an inch below the surface a morbid growth was found. This was carefully removed, and proved to be a hard glioma about the size of a walnut. The superficial part of this was distinct from the brain matter and was easily enucleated. The hemorrhage was arrested by means of the galvano-cautery and the wound brought together by sutures. At no time since the operation (20 days) has the temperature been above 100° or the pulse over 90. The patient has throughout been perfectly intelligent, and now is cheerful, and expresses much gratitude at the results of the operation. He has totally lost the lancinating pains in his head, the vomiting, and the convulsions of his limbs.

A hernia formed, consisting for the most part of clot and granular matter, which was shaved off. Since this, the paresis of the left leg has increased.

There was improvement up to the 21st day after the operation.¹ On that day occurred a rigor, followed by fever, nausea and pain in the head. A hernia cerebri of large dimensions supervened. Death ensued on the 28th day. The intellect was preserved till the last.

¹ Bennett and Godlee, *Lancet*, January 3d, 1885. p. 13.

On post-mortem examination there were found signs of meningitis at the lower portion of the wound, spreading downwards towards the base of the brain on the same side, the whole of which was inflamed and covered with plastic lymph. The rest of the brain was normal.

This was an operation planned with remarkable sagacity and executed with consummate boldness, yet, this preliminary narration of the case is so crude and so devoid of detail as to form the basis of few conclusions, and also to almost completely disarm criticism. The case is reported fully enough, however, to show how perfectly it corresponds with arguments I gave to justify the surgical removal of a cerebral tumor seven months ago; and let me repeat those arguments with a running commentary on the present case:

"Finally, accessible neoplasms of the brain," (in this case, 7 mm. below the cortex.) "which have resisted medicinal treatment," (a glioma.) "and which continue to grow and threaten life," (in this case progressive paralysis and starvation from vomiting.) "should be removed, for the reason that they are generally single," ("a hard glioma about the size of a walnut.") "seldom have secondary deposits," ("the rest of the brain was normal.") "are surrounded by an inflammatory zone of demarcation" ("The superficial part of the tumor was distinct from the brain matter and was easily enucleated.") "and always kill by pressure." (evidently what was gradually being done in Bennett and Godlee's case.)

A few words as to the justifiableness of the operation:

The nature of the lesion was unmistakable; an injury to the head followed after some months by headache, on the same side; Jacksonian epilepsy and progressive weakness on the opposite side; optic neuritis and vomiting, constitute a train of symptoms pathognomonic of cerebral tumor. That a heroic but futile course of medication had been tried is not stated, but must be inferred. The progressive nature of the ailment was manifest. The patient was delirious from pain, and losing flesh and strength from the persistent vomiting of food. To the patient, if unrelieved, a speedy and horrible death was imminent. Operation held out the only hope and was eminently justifiable.

The course being resolved upon, the symptoms, their mode of invasion and progress, located the lesion exactly.

The account of the operation is very unsatisfactory (due al-

lowance must of course be made for it, because it is partial and preliminary), and it is not stated what antiseptic precautions, if any, were taken. The nature of the zone of demarcation about the tumor is not described. The history does state that "the hemorrhage was arrested by means of the galvano-cautery and *the wound brought together by sutures.*" (Italics my own.) No provision for free drainage is mentioned, and this, if neglected, was a grievous error, inasmuch as, after checking hemorrhage by cautery, there is bound to be a certain sloughing of necrosed tissues which, if confined, may induce a septic condition.

If this negative point in the history be established, *i. e.*, that there was no free drainage, that may well account for the fatal issue; pent up necrotic and septic matter exciting the terminal meningitis.

In all recent cases of successful heroic cerebral surgery, ordinary operative details have been invariably carried out, *i. e.*, thorough antiseptic precautions and every facility for free drainage. To emphasize this, let me briefly narrate a few recent cases.

A policeman was struck over the left eye-brow by a No. 32 ball, fired from a pistol ten or fifteen feet distant.¹ He fell insensible, and remained so about a minute, when he arose and walked to the station-house.

On examination, there was found to be a wound over the left supra-orbital margin where the middle and the outer third join. A probe followed the track of the ball upwards and outwards about 2 centimeters, when it impinged on a hard body which proved to be a piece of the bullet. The wound was washed with a two and a half per cent. solution of carbolic acid, a drainage tube was inserted, and an antiseptic dressing was applied. On the second night vomiting occurred. On the second day intense pain commenced on the left side of the head and in the depth of the left orbit. Vision was lost in the left eye. For two days the headache and orbital pain remained the same.

On the fifth day the temperature rose to 39° C., and the headache increased.

Being operated upon, there was found to be a comminuted fracture of the supra-orbital ridge. Some pieces of lead were removed with pieces of bone. There was an opening into the frontal sinus, but the

¹Fenger and Lee, *Am. Jour. Med. Sci.*, July, 1884, p. 17

probe could not be passed into the cranial cavity. Eight cc. of pus were evacuated from the roof of the orbit. Carbolic acid in two and a half per cent. solution was used, a drainage tube was inserted and an antiseptic dressing was applied.

The next day the pain and headache were greatly diminished. The twenty-first day slight attacks of headache, on the left side, began to come on at intervals, and lasted two to four hours. There was perception of light with the left eye. On the twenty-seventh day there was headache and nausea. The patient was put on milk diet and physic, and was better. On the thirty-third day the patient went out. He became faint, vomited, had headache, was much depressed, and often sighed.

On the thirty-ninth day the pulse was 54; temperature, 37.5°. The patient was, with difficulty, aroused from coma. The fortieth day there was profound coma and involuntary evacuations, and a second operation was performed with antiseptic precautions, with a trephine, 17 mm. in diameter; the skull was perforated 2 cm. above the left supra-orbital ridge, 4 cm. to the left of the median line. There was no fracture of the inner table, and the button of bone removed was healthy. The subjacent dura was healthy but very tense. It was incised. A hypodermic needle attached to an ordinary hypodermic syringe was now used to make a succession of exploratory punctures. The needle was pushed first downwards, toward the roof of the orbit, whence nothing was withdrawn but a little blood and debris of brain substance. It was then introduced successively in a horizontal, backward, inward, and outward direction, the result remaining the same. A longer needle was then inserted in a direction slightly inwards, and perhaps a trifle upwards. On reaching a depth of 6.5 cm. the syringe filled with a thin, palish red and semi-transparent fluid. The needle was now used as a guide, along which the closed blades of a pair of narrow operating forceps were pushed in and were then withdrawn. On separating the blades of the forceps 30.-45. cc. of the above described fluid spurted out with some force, followed by at least a teaspoonful of thick, yellow pus. A fenestrated drainage tube was then inserted. Two hours later the pulse had risen to 64. Three hours after the operation the patient was conscious, and answered questions slowly but coherently. The next day there was no headache or nausea. The abscess cavity was washed out with a saturated solution of boracic acid. For a month the patient did well, then headache and nausea came on again. Eight days later the pulse had fallen to 64; the temperature was normal; there was headache, nausea and semi-coma. The old wound was opened up and a needle thrust to the depth of 5.8 cm. in different directions. Finally, being introduced into the region of the former

cavity, a half teaspoonful of thick, yellow pus was evacuated, and a drainage tube was inserted as before. On the second day there was no nausea and less headache. Three months later was on regular police duty; can count fingers at a distance of 1.5 metres.

Two months later had three epileptic fits. Five months later had one fit. Has had none since.

In Burckhardt's case¹ (see case 112 of table), a drainage tube was inserted in the track of the ball. The same precaution was taken in Fluhrer's case,² still more remarkable than Burckhardt's, inasmuch as a counter opening was made and through-drainage established.

A bullet entering at point about four centimetres above the left eye, a little to the left of the median line, pierced the first frontal convolution, traversed the brain backwards and a little outwards, and emerged from the upper part of the parietal lobule, where it lay slightly embedded in the brain. The symptoms were not alarming. The course of the bullet was ascertained by careful probing, and the trephine was applied over the supposed site of the ball. After a short search it was found, and a drainage apparatus composed of horse-hair and catgut passed through the entire track of the ball. The operation was done with antiseptic precautions, and the wounds were dressed with iodoform. Recovery was uninterrupted and complete. The slight weakness of the right hand and loss of memory rapidly disappeared.

Among the 115 recent cases of trephining cited in my table, in twenty it was specifically stated that free drainage was employed. Of these twenty cases, one was a long neglected cerebral abscess (case 44), and the other (case 82) was a large abscess and tremendous disorganization of the brain. These two cases proved fatal in spite of drainage, while the remaining eighteen, or ninety per cent., recovered.

Among the twenty-nine fatal cases recorded in my table, in two only, or 6.8 per cent., is it distinctly stated that free drainage was established, while in the remaining twenty-seven cases, or 93.2 per cent., there is no mention made of drainage. It is but fair to state, that in eleven of this latter class, the prognosis was very bad from the first, and in some, death took place in a few hours after the injury or operation. Still the foregoing

¹ *Deut. Zeits. für Chir.* 1881. Bd. 15, 5, 582

² Case of Dr. Wm. H. Fluhrer, unpublished. Quoted by permission.

facts emphasize the importance of free drainage, and I can but repeat the injunction in my previous paper :

"Let the operation always be done with antiseptic precautions. Try and secure only approximate coaptation of the flaps. Provide the freest possible drainage. Use cold antiseptic dressings, without much compression. Enjoin the strictest quiet in a posture facilitating drainage."

It seems, absurd, at this late day, to adduce arguments for more heroic cerebral surgery, when we recall the fact that Dr. William Detmold, of New York,¹ opened a cerebral abscess, with great benefit to the patient, and, later, evacuated pus from the lateral ventricle of the same patient, *thirty-six* years ago.

The operation was justifiable, was boldly planned and executed, and, as it is unfamiliar to many, I submit a brief résumé :

The patient was a male of forty. He received a heavy blow on the left frontal region. One month later, after the patient had gotten up and was about the house, and after the removal of considerable necrosed bone, he sank one day into a condition of profound stupor. He was motionless, but neither paralyzed nor convulsed; breathing, stertorous; pulse, 40 and occasionally intermitting.

Dr. Detmold first removed more necrosed bone, leaving an opening in the left frontal region 12.5 cm. square. As the removal of this bone caused no amelioration on the part of the patient, he opened the dura and swept about under it with a probe, and ascertained that nothing morbid was there.

"Confident, however, that an abscess in some part of the brain was the cause of the present condition of the patient, and equally certain that unless speedy relief was given, he must inevitably sink within a few hours, I determined to make an incision into the brain; and in the hope that my first impression about the fluctuation had been correct, and that, as I stated above, the removal of the tension had rendered the fluctuation indistinct again, I chose this place, where the brain was now already denuded of dura-mater, and made an incision into the substance of the brain, about an inch in length and about half an inch in depth, which was followed instantaneously by a thick stream of healthy-looking pus; * * *" From 60-150 cc. of pus were evacuated, the patient opened his eyes, said he felt better, and put out his tongue when requested. A warm water dressing was used. The wound healed,

¹"Abscess in the Substance of the Brain; the Lateral Ventricles Opened by an Operation."—*Am. Jour. Med. Sci.*, Jan., 1850.

with the exception of a small sinus, and three weeks after the operation the patient was out of bed. Then ensued a period of comparative health, with the exception of an aphasic condition, which Dr. Detmold describes well.

Thirty-seven days after the operation, stupor again came on, with headache and tremors. Re-accumulation of pus was suspected, but an incision into the brain, 3 cm. deep, evacuated none. In spite of this, he improved very much in the next four days. A probe could be passed 13.5 cm. into the brain. In the next few days he had a rigor, vomited, and became worse. He had suppression of urine, and great abdominal tenderness.

Dr. Detmold determined to make a last attempt to relieve his patient, and made an incision into the left lateral ventricle, evacuating pus freely. Seven hours later, however, the patient died, having secreted no urine for twenty-four hours. A post-mortem examination showed that both lateral ventricles contained pus. "There was a deposit of lymph, intermixed with pus, upon the choroid plexus, and the same deposit could be traced through the third and fourth ventricle, making its appearance at the base."

Considering that antiseptic surgery and cerebral localization took their birth about twenty years later, this is, and will remain, the most remarkable case on record, a credit alike to the wisdom and daring of the distinguished surgeon.

The subjoined table is given in full to prove that trephining, as now conducted, is not, *per se*, a dangerous operation. Walsham's tables¹ are excellent, and only open to the objection that they contain many old cases. To give statistics their fullest value, it seems as though we should cite *only* cases occurring since the general adoption of Listerism.

I have reviewed one hundred and fifteen cases, occurring since 1879, in which trephining, or kindred operations about the head, have been performed for various causes, not confining myself to cases treated antiseptically.

These cases I have not subdivided into classes, as did Walsham, but have tabulated so as to show the injury or pathological condition present, the prominent symptoms preceding and following the operation, the kind of operation and its findings, the dressing or subsequent treatment of the wound, and the

¹*St. Bartholomew's Hospital Reports*, 1882, vol. xviii, p. 213, and 1883, vol. xix, p. 127.

final result. From these data, it has been possible for me to arrive at pretty conclusive evidence as to the mortality of the operation *per se*, as looked at in the light of modern surgery.

Walsham deduced, from a careful study of his seven hundred and seventy cases, the conclusion that trephining was a fatal operation in only 10.6 per cent. of published cases. This is, indeed, a startling fact to those who have always held the operation in such awe as to consider it a last resort.

The introduction of antiseptic precautions has modified the results of cerebral surgery as it has those of general surgery. Of the one hundred and fifteen unselected cases studied by me, twenty-nine died. Of these, twenty-five presented at the time of operation symptoms endangering life, thus leaving only four cases, 3.2 per cent., in which the fatal issue could even be remotely traced to the operation. One of these, that of Bennett and Godlee, it seems hardly fair to include as one caused by operation, as the patient was *in extremis* when operated on, and had at the time a *surely* fatal malady. Still, to give pessimists the benefit of the doubt, we will include it. The other three cases are Nos. 42, 55 and 82 of the table. Yet in the two latter, at least, there were at the time of operation pathological conditions likely to prove ultimately fatal.

As 3.2 seems extremely low, and would render the operation, as now conducted, practically harmless, it may be well to summarize the reasons for rejecting the twenty-five deaths as independent of the operation.

In six cases, symptoms of abscess of the brain declared themselves before the operation was performed. In five, a meningitis existed at the time of operation. In four cases, shock caused death; two died of hæmorrhage from a branch of the middle meningeal artery (not wounded in the operation); one died of hæmorrhage from the middle cerebral artery, severed by a stab-wound of the head; one died of hæmorrhage from a lacerated longitudinal sinus; one of galloping consumption, which was hereditary; one of pneumonia; one of extensive laceration of the brain; one of opium-poisoning; and three, I accept, on authority of the physician reporting them, as not dying from the effects of the operation.

ANALYTICAL TABLE OF 115 RECENT CASES OF SURGICAL INTERFERENCE IN AFFECTIONS OF THE BRAIN.

No.	AUTHORITY, &c.	SEX.	AGE	INJURY.	SYMPTOMS.	OPERATION.	DRESSING.	RESULT.	REMARKS.
1	NORTON. <i>Tr. Clin'l. Soc.</i> , Lond., 1880, XIII., 48-51.	M.		Syphilitic Necrosis.		Removed frontal bone, roof of both orbits, cribriform plate of the ethmoid, parts of both superior maxillae, palate and left greater wing of sphenoid.		Recovery.	
2	RANKIN. <i>St. Louis Med. & Sur. Jour.</i> , 1880, XXXIX., 124-127.	M.	34	Minie ball.	Compression.	Trephined.		Recovery.	
3	"	"	"	"	Two years later first epileptiform convulsion and commencing dementia.	Trephine and Hey's saw used above left frontal sinus. Depressed bone removed 6x5 cent., including a nipple shaped protrusion from inner table.	Carbolic water.	Recovery, except from dementia.	
4	BRIGGS. <i>Tr. Amer. Med. Assoc.</i> , 1880, XXXI., 755.	M.	14	Kicked by a horse in anterior half of right parietal bone.	Unconscious for several hours. Convulsive movements of left arm.	Three buttons removed		Recovery.	

No.	AUTHORITY, &c.	SEX.	AGE	INJURY.	SYMPTOMS.	OPERATION.	DRESSING.	RESULT.	REMARKS.
5	M'CUTCHEON <i>N. O. Med. & Sur.</i> Four. 1881, IX. 259.	M.		Blow near occipital protuberance.	Was blind for 6 weeks.	Trephined.		Recovery.	
6	"	"		"	Later, after wound had all healed, symptoms of compression came on.	Trephined.		Recovery.	In this remarkable case the head was trephined five times for five different purposes, each operation being productive of no dangerous and only beneficial results.
7	"	"		"	Epilepsy supervened after a period of apparent cure.	Trephined.		Recovery.	
8	"	"		"	Became the victim of atrocious headaches.	Trephined.		Recovery.	
9	"	"		Necrosed bone.		Trephined.		Recovery.	
10	PAGE. <i>Brain</i> , 1881 and 1882, IV. 399.	F.	19	Pistol wound little above and behind the right frontal eminence. Did not wound the skull.	On second day a rise of temperature and inflammation about the wound. On seventh day "hysterical" convulsions, four in one day. Partial left hemiplegia. T. 41° P. 112.	Trephined on the 7th day and a clot of blood and a few drops of pus evacuated.	Lister.	Death preceded by coma on twenty-first day.	On 9th day marked hemiplegia & internal strabismus of left eye. Prominence of veins of both optic nerves. Later, choked disc r. eye. 16th day much better
11	RIVINGTON <i>Brain</i> , 1881 and 1882, IV. 413.	M.	31	File fell on posterior superior angle r. parietal bone. Punctured wound.	Three days later developed headache, delirium and slight left hemiplegia.	Trephined 1 mo. after injury. Gouge forceps used. Dura punctured and pus escaped in jets.		Relief from pain and discharged cured in 2 months.	

12	"	"	"	Same case (11) readmitted in 9 months with convulsions and l. hemiplegia.	Old wound opened.		Relief.
13	"	"	"	Same case readmitted 7 mos. later for convulsions following a few days headache. Speech and vision impaired.	Four days after admissions a small piece of dead bone removed.		No improvement.
14	"	"	"	Same case readmitted 4 mos. later. Left hemiplegia most marked in the leg. Double optic neuritis.	Another piece of dead bone taken out. Trephine hole enlarged. Dura punctured and pus escaped in jets. About 250 CC. during the night. Opening in dura enlarged and director passed 5 cent. into brain.		Discharged cured 2 mos. after last operation, 16 mos. after first injury. After evacuation of pus walked and moved left arm and fingers freely. Speech not so thick, 1 mo. after operation headache ret'd, and had a fit. Discharge increased—15 day wound healed, 30 days discharged cured.
15	BARTLETT. <i>St. Louis Med. & Sur. Jour.</i> , 1879, XXXVI, 211.	M.	20	Escape of large amount of blood and brain substance.	Wound in skull 2.5x1.5 cent. cleared out.	Compresses and ice.	Death, preceded by high temperature.
16	ASHHURST. <i>Hosp. Gaz.</i> 1878, IV, 301.	M.		Trephined at once.			Death on 2nd day. Autopsy revealed section of a posterior branch of left middle meningeal artery and a diffuse blood clot over left hemisphere.

No.	AUTHORITY, &C.	SEX.	AGE	INJURY.	SYMPTOMS.	OPERATION.	DRESSING.	RESULT.	REMARKS.
17	DUFFIELD. <i>Med. Gaz.</i> 1880, VII., 247.			Compound fracture.		Trephined.		Recovery.	
18	KELLEY. <i>N. Y. Med. Rec'd</i> , 1880, XVIII., 64.	M.	7	Kick of horse. Compound fracture of posterior superior angle of right parietal bone.		Removed two pieces of bone, 5x3.25 cent. and 2x2 cent.	Ice and free drainage.	Recovery in 7 weeks.	
19	"	M.	33	Struck by engine. Compound fracture frontal bone to left of median line at junction with parietal.		Fragments removed—one penetrating the brain—great gush of blood.	Ice.	Recovery.	
20	WEST. <i>Roy. Soc., Lond.</i> , <i>Proc. Roy. Med. & Chir. Soc.</i> , Lond., 1880, VIII., 439.	F.	14	Struck with a stone.	Eight years later epilepsy and idiocy with impairment of speech and involuntary evacuations.	Two buttons of bone removed with trephine.	Antiseptic.	Speech returned and control of bladder and rectum.	
21	BENTON. <i>Proc. Med. Society Co. Kings</i> , 1883- 1884, VIII., 256.	M.	14	Blow of stone, weighing 5 kilo, on left temporo-occipital region. Dura extensively lacerated.	Hematoma, 30 grams of clear cerebral substances saved.	Evacuated hematoma and removed 7.5 x 6.5 cent. of depressed bone.	Carbolic.	Recovery with no paralysis.	A large hernia cerebri formed which was cut off.

22	"	M. 7	Kick of horse. Compound fracture left fronto-temporal region. Dura lacerated and extrusion of brain substance.	After operation was semi-conscious 2 or 3 days and had slight paralysis on the right side.	Trephined and removed bone 6.5x4.5 cent.	Antiseptic.	Recovery with slight incoordination of the lower extremities and some mental impairment.
23	"	M. 28	Wrench fell 15 metres on head. Compound fracture vertex. Laceration of dura and loss of cerebral tissue.	Hemorrhage from longitudinal sinus.			Recovery.
24	MCCORMACK <i>Am. Prac.</i> 1883, XXVII, 237.	M. 23	When 15, felled with a pointed hammer.	Was unconscious several hours, and then recovered perfectly. When 23 pain at site of wound and acute maniacal attacks set in.	Compound depressed fracture 2.5 cent. in diameter at juncture of sagittal and coronal sutures. Three buttons removed, including the depression.		Recovery.
25	MUNFORD. <i>Am. Prac.</i> 1883, XXVII, 337, seq.	M. 14	Fracture, right parietal bone just above temporal ridge.	Coma.	Trephined.		Death.
26	"	M. Adult	Compound fracture anterior angle of left parietal bone.	Aphasia.	Trephined, with escape of clotted and fluid blood.		Recovery.

No.	AUTHORITY, &c.	SEX	AGE	INJURY.	SYMPTOMS.	OPERATION.	DRESSING.	RESULT.	REMARKS.
27	MUNFORD. <i>Am. Prac.</i> , 1883, XXVII. 237, seq.	M.	Adult	Compound fracture across transverse diameter of l. parietal bone. Circular saw.	Eight days later fever, headache and mania.	Hey's saw used.	Wound left open. Flooded with tepid water.	Recovery.	
28	"	M.	Adult	Compound fracture 4 cent. above left eye. Breech pin of gun.	Wound healed and man went to work in 2 weeks—then convulsions came on.	Cicatrix opened and depressed bone remov'd.		Recovery.	
29	GAV. <i>Buffalo Med Four.</i> , 1881-1882, XI. 111.	M.	18	Struck on head by step of car.		Trephined midway between occipital protuberance and r. mastoid process, 3 mm. depression removed and a spiculum of bone 12 mm. long extracted from brain.	Free drainage.	Recovery in one month.	
30	"	M.	23	Compound fracture in right supra-orbital region. Fell 5 metres.		Trephined on fifth day. Clot removed from membrane.	Drainage tube.	Recovery 16th day.	
31	ROBERTS. <i>Am. Prac.</i> , 1883, XXVII. 337, seq.		45	Blow with beer mug 2.5 cent. above left frontal eminence.	11th day pain, fever, anorexia, nausea, vomiting. 15th day chill.	Trephined on 15th day.		Death 15th day.	Operation afforded no relief. Was an abscess on the posterior surface of the brain.

32	"	M.	23	Knocked through bridge 10 metres and struck on head.	3rd day chill, fever, nausea, etc. 5th day aphasia and 12 convulsions. 6th day 7 convulsions.	Trephined on 6th day. Evacuated 45 cc. dark blood.	Recovery.
33	"	M.	16	Block of wood fell 10 metres on head.	Morning following injury imperfect use of left arm and leg. 25th day chills, fevers, sweating and increased paralysis.	Trephined 25th day and evacuated 30 cc. of pus.	Death on 32nd day. Headache was relieved by the operation and was doing well. Against order walked ten metres to commode, hernia cerebri appeared and death occurred in 8 hours.
34	"	M.	6	Compound fract. over l. frontal sinus 5 cent. in diameter. Blood and brain matter exuding.			Antiseptic drainage. Recovery.
35	"	M.	30	Gun shot wound upper fourth of left parietal bone.	Two years after injury headache, epilepsy and dementia.	Trephined and bone and lead extracted from dura.	Recovery.
36	HEUSTIS. <i>Tr. Med. Ass</i> <i>Alabama</i> , 1881, 506.			Punctured fracture.	For some days stupor and convulsion.	Symptoms of abscess had set in before operation was performed.	Death. Was inflammation and liquefaction of a large amount of brain substance.
37	"			Depressed fracture of frontal bone.	The wound healed and convulsions set in.		Death. Death from convulsions imminent before operated on.

No.	AUTHORITY, &c.	SEX.	AGE	INJURY.	SYMPTOMS.	OPERATION.	DRESSING.	RESULT.	REMARKS.
38	BRIGGS. <i>Nashville Four. Med. & Sur.</i> , 1880, XXV, 14.	M.	19	When 11 fell on head.	Was unconscious six days, 10 mos. later, de- veloped violent convul- sions and dementia. At time of operation was having forty to fifty a day.	Trephined and re- moved depressed bone.		Improve- ment marked one month after the oper- ation.	
39	DORR. <i>Buffalo M. & S. Four.</i> , 1879-1880, XIX., 475.			Compound frac- ture, 5.5x1. cent., extending directly upward from right eye.		Dental engine used.	Cold water.	Recovery.	
40	"	M.	30	Simple fracture right parietal emin- ence, 4x3 cent., and oval in shape.	On the 21 day after the operation there was men- tal sluggishness. On 3rd day had weakness of the left arm and leg.	Dental engine used.		Recovery.	
41	BERRIN. <i>Bul. et Mem. de Soc. de Chir.</i> , 1883, IX., 495.			Syphilitic exos- tosis in left frontal region.	Paralysis of right arm, right side of the face and pretty complete aphasia.	Trephined and re- moved bone 4x2 cent.		Recovery from paraly- sis complete; from aphasia partial.	
42	SYLVESTRINI <i>Bul. de l' Acad. de Med.</i> , 1883, 439.	M.	15	Kick of horse in right temporo-frontal region.	5 mos. after injury pa- ralysis of right arm and leg and lower part of right face. Incontinence of urine and feces. Right hemi-epilepsy, complete aphasia.	Trephined over centers for extremities. Found organized clot, 3 cent. in diameter by 1 cent. thick. This was extracted piecemeal.		Death on 4th day.	Purulent mening- itis, abscesses in brain, 1 at foot of ascending frontal convolution, 1 under inferior extremity fissure of Rolando.

43	DEMOS. <i>Bul. et Mem. de Soc. de Chir.</i> , 1883, IX., 472.	M.	39	Fell 14 metres on head, causing slight wound on right side near the front.	Immediate loss of consciousness. On 3rd day convulsions of face, and later, complete paralysis of left upper and lower extremities. Went to work in 4-5 mos., but had much general headache. After 10 months convulsions of left face, preceded by formation running up the left arm. Later, spasms of left arm and leg occurred lasting forty seconds and followed by paralysis. Some deafness in left ear and anaesthesia of left hand.	On 23rd day trephined, but found no pus. On 25th day trephined again and 60 cc. of pus was evacuated. Style introduced many cent. into cavity of abscess.	Inserted drainage tube 3 cent. and washed out cavity with 1-20 solution carbolic acid.	Death nine days after last operation.	Recovery.	Day after operation paralysis less. None at all on the 18th day. Hearing in left ear and sensibility, left hand did not improve much.
44	POLAILLON. <i>Bul. et Mem. de la Soc. d. Chir.</i> , 1882, VIII., 587.	M.	40	A blow on the head followed by a slight swelling over the coronal suture.	20 days later atrocious nocturnal headaches and sensation of swelling and deformity of the head. On 23rd day tumor incised and 8 cc. thick pus evacuated. Denuded bone found and probe penetrates 4-5 cent. Left arm gets asleep and speech was impaired. Paralysis of left side of face. Later, left arm became stiff, while sensibility was preserved, and coma, with rise of temperature toward night.	Against orders of surgeon patient had been removed from hospital by friends. Was much improv'd by drainage and washing out of abscess cavity.				

No.	AUTHORITY, SEX &C.	AGE	INJURY.	SYMPTOMS.	OPERATION.	DRESSING.	RESULT.	REMARKS.
45	CHALOT. <i>Bul. et Mem. de la Soc. de Chir.</i> , 1878, IV., 486.	25	Contused wound, right parietal region	On 9th day chill.	Trephined on 9th day. Nothing found. Trephine opening found over first and second frontal convulsions.		Death on 14th day.	3 hrs. after operation repeated chills. There was a meningitis over the three frontal convulsions of the right side.
46	HULKE. <i>Med. T. ana Gaz.</i> , 1881, II., 85.	21	Fell a metre and struck right temple on stone wall.	6 mos. later had 14 severe fits in 24 hours. In next 24 hours had 10 fits. Spasms, chiefly of masseters and upper lip. Opisthotonos, headache.	Trephined just behind temporal ridge of right side 2.5 cent. above its origin. Aspirator needle thrust in 3 cent. and for few minutes cerebro-spinal fluid spurted out, nearly 30 cent.		Death from hereditary galloping consumption.	Was not much improved by operation.
47	LUCAS. <i>Med. T. ana Gaz.</i> , 1881, I., 457.	46	Heavy beam fell 10 metres on head above right frontal eminence.	Vomiting, paralysis of right side of face, irritability.	Ten pieces bone removed, one had pierced the dura.	Spray and carbolic dressing.	Recovery.	
48	" p. 486.		Extensive laceration of temporosphenoidal lobe.		Trephined.		Death.	Death independent of operation.
49	" p. 516.	32	Fall on back and head.	5 mos. later headache, partial right hemiplegia and aphasia.	Trephined in left occipital region.		Recovery.	Headache relieved.
50	HUNT. <i>Ann. Anat. and Sur. Soc</i> 1880, II., 433	18	Struck with bar of iron. Compound fracture left parietal region.		Trephined and elevated bone, which was depressed 2 mm. over an area of 3 cent.	Carbolic water. Drainage tube. Antiseptic lint	Recovery.	

51	DOWSON. <i>Med. T. and Gaz.</i> , 1878, II., 378.	M.	25	Stab wound above left ear.	Profuse and uncontrollable hemorrhage from the wound.	Trephined, but bleeding point was seen to be deep in the brain.		Death in 21 hours.	Middle cerebral artery was found cut.
52	JORDAN. <i>Med. T. and Gaz.</i> , 1879, II., 1.	M.	20	Struck in middle of right parietal bone by falling slate. Loss of cerebral substance.	Next morning could walk, but there was left hemiplegia.	Trephined. Bone, pieces of felt hat and paper removed from brain. One fragment of bone penetrated the brain 3 cent.	Compress. Terebinte and water.	Recovery.	Temperature one day 40° C.
53	GANT. <i>Br. Med. Jr.</i> 1880, I., 479.	M.	29	Compound fracture left parietal bone.	2d day delirium, T. 39° C. 3rd day partial paralysis right arm and right side of the face. 8 hours after operation a fit, consisting of flexion and extension of right wrist and fingers. Eyes, head and mouth to right. Both eyebrows twitched up and down. On 5th day spasm invaded r. leg.	Trephined on 4th day over supra-marginal convolutions. No improvement.		Death on 6th day. T. at time 41° C.	On autopsy a spicule of bone was found on the brain. Both hemispheres covered with greenish pus.
54	HAYES. <i>Br. Med. Jr.</i> 1879, II., 321	F.		Burn on right side of the head.	16 days later became delirious; nausea and vomiting. Paralysis of left side of the body.	3 months after injury right parietal and right half of frontal removed entire.		Recovery.	2 months after operation skin was grafted on granulating dura and a compress was applied. The next day there was complete left hemiplegia which lasted 4 days. Entirely disappeared.

No.	AUTHORITY, &c.	SEX.	AGE	INJURY.	SYMPTOMS.	OPERATION.	DRESSING.	RESULT.	REMARKS.
55	BRIDDON. <i>N. T. Med.</i> <i>Four.</i> , 1879. XXIX., 309.	M.	61	Brick fell on head causing compound depressed fracture, 4 cent. long, to right of vertex.	3rd day after operation chill, fever and headache. Photophobia. 6th day vomiting and stupor. 9th day chill, involuntary evacuations, twitchings of the face.	Bone removed and margins smoothed with a rongeur 8th day dura incised and a little pus and blood evacuated.	Proof spirit.	Death.	False membrane adherent to left hemisphere. Accumulation of greenish pus in arachnoid
56	ALLIS. <i>Phil. Med. T.</i> 1881, XII. 576			Dagger wound of anterior, inferior angle of left parietal bone.	Compression and hemiplegia, aphasia. After operation could move right arm. In a week could walk with a cane. Never fully recovered power of speech.	Trephined in 10 hours. Evacuated 30 cc. of dark fluid blood.		Recovery.	Died 3 mos. later of smallpox.
57	BRINTON. <i>Phil. Med. T.</i> 1881, XII. 576	M.	Adult	Fly wheel. Arch- ed fracture across frontal bone from one ext. ang. process to the other.		Lower fragment under upper unlocked with saw and raised with suction sound.		Doing well when reported.	
58	"	M.	Adult	Depressed compound fracture centre of occipital bone	Severe hemorrhage.	Trephined and lateral ligature of the lateral sinus.		Recovery.	
59	NANCREDE. <i>Phil. Med. T.</i> 1883-4, XLV. 440.	M.	Adult	Head caught between an iron lever and a large beam. About $\frac{2}{3}$ right temporal fossa crushed in, 3 cent. deep. Dura uninjured.	Walked. No motor or sensory disturbance.	Bone removed and middle meningeal artery ligated.	Mercuric bichloride.	Recovery.	

	Boon.	M.	Child	Stone hurled with great force. Depressed fracture left side of frontal bone	Unconscious. Next morning partly conscious. During day 13 convulsions before 6 p.m.	On second day removed depressed bone.	Weak carbolic.	Recovery.	On 7th day severe bilateral convulsions, lasting ten minutes.
60	Boon. <i>Lancet</i> , 1881, II., 788.								
61	COTTELL. <i>Lancet</i> , 1881, II., 789.			Compound depressed fracture left temporal region.	Unconsciousness.	Trephined, with immediate return of consciousness.	Wound left open. Carbolic lotion.	Recovery in one week.	
62	LEAHY. <i>Lancet</i> , 1882, I., 346.			Compound fracture in anterior angle of right parietal bone.	Highest T. 39° C.	Much splintered, inner table removed.		Recovery.	
63	BLANC. <i>Lancet</i> , 1882, II., 1023.			Compound fracture just above frontal eminence, extending across frontal suture. Large wound longitudinal sinus.	11th day ptosis of left eye. 12th day left facial paralysis. Day after operation less ptosis, <i>no</i> facial paralysis. 27th day stupidity and epileptic convulsions. 28th day comatose, incontinence of urine and feces, vomiting, wound raised and pulsating. 31st day free suppuration and improvement set in.	Trephined on the 12th day. Some fragments penetrated the brain.	Antiseptic. Drainage tube. Wound closed.	Recovery.	
64	"			Depressed fracture near centre right parietal bone.	2nd day delirium and paralysis left lower extremity. 5th day epileptiform convulsions. 6th day severe fits and increased paralysis. Left arm involved.	Trephined on 27th day. Immediate relief of paralysis.		Recovery on 49th day.	

No.	AUTHORITY, &C.	SEX.	AGE	INJURY.	SYMPTOMS.	OPERATION.	DRESSING.	RESULT.	REMARKS.
65	BLANC. <i>Lancet</i> , 1882, II., 1023.			Compound frac- ture above left eye. Dura and brain punctured.	3rd day delirium. T. 40° C.	Trephined on 3rd day.	Antiseptic. Drainage.	Recovery on 44th day.	
66	HULKE. <i>Lancet</i> , 1883, II., 814.	M.	Adult	Ladder fell on right temple.	Worked 2½ days. Much headache. Right hemiplegia and spastic condition of left side.	Trephined on 23rd day. No fracture found, but dura bulged. Aspi- rator needle inserted 3 cent. 16 cc. brown floe- culent fluid oozed out.	Drainage by oiled silk and a boric tent.	Recovery.	
67	WATSON and ORCHARD. <i>Lancet</i> , 1884, I., 11.	Boy.		Ladder fell on right frontal region.	Unconsciousness.	Trephined on 7th day and removed splintered internal table.		Recovery.	On 18th day her- nia cerebri formed. Delirium ptosis of r. eyelid. Incontin- ence. Second month twitching left side of face and body. Later, complete hemiplegia, from which patient re- covered as tumor disappeared.
68	WRIGHT and POLLARD. <i>Lancet</i> , 1884, I., 340.	M.	23	Rope block fell on right side of frontal bone.		Trephined.	Lister.	Recovery.	

						Trephined.	Lister.	Recovery.
69	"	M.	5	Kicked by horse. Right parietal bone.				
70	"	M.	10	Fell 6 metres. Depressed fracture right upper half frontal bone. Dura torn.		Trephined.	Lister.	Recovery.
71	BRUSH. <i>Cin'ti Lancel and Clinic</i> , 1882, VIII., 231.	M.	12	Fracture of skull by falling slate. Right frontal and parietal over-riding left. Bones separated to nose.	Hemorrhage from mouth.	Depression elevated.		Death in 2 hours.
72	"	M.	35	Fracture from blasting, in left temporo-occipital region.	3rd day rise of pulse and temperature. Unconsciousness.	Trephined.		Recovery.
73	"	M.	40	Fracture from blasting.	Dazed for ten days.	Trephined at once.		Recovery.
74	DONNELLY. <i>Pacif. M. & Surg. Jour.</i> , 1881, XXIV., 494.	M.	54	Timber on side of head. Comminuted fracture of left parietal bone.	Wound healed, but was aphasic 4 mos. In 18 mos. was at work, with some improvement of hearing on left side. Some headache, 11 years later much headache.	11 years after injury trephined below left parietal protuberance, removal of spear-shaped piece of bone 2 cent. long, 1.5 cent. broad.		Recovery.

6th day hernia cerebri. Repressed with sheet lead.

At first some improvement followed the operation.

Was mining again in 2 months. Deaf in left ear.

Had also a compound fracture of tibia and a simple fracture of the clavicle.

No.	AUTHORITY, &c.	SEX.	AGE	INJURY.	SYMPTOMS.	OPERATION.	DRESSING.	RESULT.	REMARKS.
75	MESSIER. <i>Birmingham Med. Rev.</i> , 1883, XIII, 202.	M.	18	Railway buffer. Compound depressed fracture.		Trephined.		Recovery.	Arm amputated at same time.
76	"	M.	33	Compound depressed fracture parietal and frontal bone.		Trephined.		Recovery.	
77	"	M.		"General smash" of frontal, temporal and parietal bones by a large iron girder.	Protrusion of brain into frontal sinuses.	Trephined.		Death in 3 hours.	Some temporary improvement followed the operation.
78	EVE. <i>South. Pract</i> 1883, V., 8.	M.	44	Struck head on bridge beam.	Insensible 3 hrs. Well and at work in 3 weeks. 13 years later oppression left temporo-occipital region. Two buttons of bone removed.	14th year trephined. Depression 1 cent., in left temporo-occipital region. Two buttons of bone removed.		Recovery.	A few convulsions during convalescence.
79	JACOBSON. <i>Guy's Hosp. Gaz.</i> , 1878, III., 112.	M.	11	Knocked down by locomotive. Compound comminuted fracture right parietal bone.		Trephined and pieces bone removed 4x4 cent.	Antiseptic under spray.	Recovery.	

80	M.	10	Kick of horse on right parietal bone. Fracture 4x7.5 cent.		Trepined.	Recovery.	
	SMITH. <i>Nash. Jour. M. and S.</i> , 1882, XXIX., 15.				Trepined and removed bone to cover space 7.5x8.	Recovery.	
81	KELLY. <i>Med. & Sur. Reporter</i> , '79 XL., 43.	7	Kick of horse on posterior and upper border of left parietal bone.	Comatose.		Recovery.	Carbolic acid and cold water.
82	NOYES. <i>Am. Jr. Med. Sci.</i> , 1882. LXXXIX., 45	19	Breach pin of gun projecting 4 cent. through roof of right orbit into brain.	Insensible 4 days.	5 mos. after injury foreign body removed. 16 days later left hemiparesis and other symptoms led to a trephining about 7.5 cent. above right ext. ang. process frontal bone. 20 cc. dark purulent matter evacuated by aspirator needle. Probe and drainage tube passed through brain to the opening of roof in orbit. Syringed with 4 per cent. solution of boracic acid. 27th day double optic neuritis. 37th day finger passed 8 cent. through roof of orbit and brain found badly disorganiz'd	Death six months after injury, 40th day after operation.	On autopsy there was found immense cavity in right frontal lobe, but neither this nor the external wounds communicated with the subdural cavity.

No.	AUTHORITY, SEX, &c.	AGE	INJURY.	SYMPTOMS.	OPERATION.	DRESSING.	RESULT.	REMARKS.
83	SANDS, <i>Ann. Anat. and Surg.</i> , 1883, VIII-99	M. 13	Fell from horse. Hematoma on right parietal region. Extensive depressed fracture. Rent in dura mater.	Semi-comatose. Partial left hemiplegia.	Trephined second day. Much brain substance escaped. Longitudinal sinus wounded in operation.		Death in 2 hours.	
84	"	F. 14	Kicked by horse. Large compound frac. frontal bone.	Unconscious.	Trephined by Parry. Depression 5x1.5 cent. removed.	Salicylized cotton. Catgut drainage.	Recovery 14th day.	
85	"	M. 23	Kicked by horse. Compound fracture frontal bone.		Trephined by Weed. Aperture 3.25 x 2.25 cent. left.	Iodoform dressing. Catgut drainage.	Recovery 14th day.	
86	"	M. Adult	Fell eight stories. Compound fracture right parietal bone.	Comatose.	Bone removed by Weed, leaving oval aperture 4.5 cent. long.		Death in 36 hours.	Was fracture of spine in upper dorsal region and compound fracture right femur.
87	"	M. 40	Fell on stove. Compound fracture left occipital region.		Depressed bone 2x4 cent. removed by King.	5 per cent. solution of carbolic acid. Catgut.	Recovery 14th day.	

88	"	M.	26	Struck on head by piece of slate weeks. Had a left hemiplegia which disappeared in 7 mos. Few weeks after injury epilepsy appeared followed by some dementia.	Was in bed several weeks. Trephined depressed bone from near right parietal eminence. An aperture 4.5x5 cent. made. No morbid appearances, except thickened, vascular bone was found.	Nine years after injury and drainage.	Iodoform dressing.	Recovery in two weeks.	Epileptic and mental condition only amelioration.
89	"	F.	39	Struck left parietal region against sharp corner. Knocked down and dazed.	2 weeks after injury epileptic fit commencing in right hand. Headache in right frontal parietal region. 3 weeks later weakness of right hand and right side of face, tenderness on site of injury. 2 months later right hemiplegia and aphasia, choked disk, both sides.	Trephined 3 mos. after injury 5 cent. above auditory foramen on line parallel with zygoma. Gouge forceps also used. Hypodermic needle, thrust into brain 3 times. Twice met great resistance entering the tumor afterwards found.	Iodoform dressing.	Death 8th day. Probably from opium poisoning.	On autopsy was found a gummy tumor, 3 cent. in size, in middle of ascending parietal convolution.
90	JONES. <i>Lancet, Lond</i> 1881, II., 40.	M.	27	Compound fracture frontal bone.	A week later severe headache, a convulsion and strabismus.	Removed depressed bone by trephining.		Death, preceded by agitis at the base and temperature about the cerebellum of 41.5° C.	Purulent meningitis at the base and temperature about the cerebellum.
91	"	M.	19	Fell 6 metres.	Insensibility. Convulsions and paralysis of right side.	Trephined over middle meningeal artery. Clot removed.		Death.	A tear of the longitudinal sinus.

No.	AUTHORITY, &c.	SEX	AGE	INJURY.	SYMPTOMS.	OPERATION.	DRESSING.	RESULT.	REMARKS.
92	JONES. <i>Lancet, Lond</i> 1881, II, 40.	M.	53	Fall. Compound fracture over left eye and through left orbit.	Severe hemorrhage.	Trephined.	Antiseptic.	Recovery.	
93	MURRAY. <i>Lancet, Lond</i> 1883, I., 724.	M.	38	Thrown out of cart. Extensive fracture of parietal bone.		Trephined.	Spray and carbolicized oil.	Recovery.	
94	BUTCHER. <i>Dub. Jour. Med. Science</i> , 1881, LXXVII. 382	M.	36	Depressed fracture from kick of horse.	Convulsions.	2½ yrs. after accident trephined, removing the depression.		Recovery.	
95	JALLAND. <i>Br. Med. Jr.</i> 1881, II. 1056	M.	8	Hit on head with pointed piece of wood.	14 days later a fit. After operation temperature rose to 39.5° C. Spiculum piercing the dura. 1 mo. later opened an abscess followed in 4 days by right hemiplegia.	Trephined, removing depressed bone and a spiculum piercing the dura. 1 mo. later opened an abscess situated within the brain. Pus violently ejected.	Lister.	Death.	On autopsy large abscess was found opening into the left lateral ventricle.
96	BECK. <i>Med. T. and Gaz.</i> , 1882, I., 172.	M.	12	Kicked in forehead by horse.	Insensibility 2-3 hrs. followed by clonic spasms	Trephined and brain substance found lacerated	Lister.	Recovery 2 months.	

97	WALKER. <i>Detroit Clinic</i> , 1882, I., 123.	M.	3	Blow on head with buckle just above left frontal eminence.	4th day chill and pain. Temperature 41° C. 5th day left hemiplegia.	Trephined fourth day and removed loose bone.	Death 6th day.	Disorganized brain and purulent meningitis.
98	LONGMORE. <i>Br. Med. Jr.</i> 1882, II, 928.	M.	37	Bullet wound in right temple.	Unconscious a week. 11th day vomiting, head- ache and complete left hemiplegia, which disap- peared in about a month. 15th mo. convulsions and hernia cerebri appeared.	7th month removed, weighing 8 grams. 15th month old wound re- opened, hernia cerebri cut off and small spicule removed from the brain.	Recovery.	
99	CLARK. <i>Br. Med. Jr.</i> 1883, I., 767.	M.	26	Bale of goods fell on right side of head.	On 6th day tempera- ture rose 41° C. Much pain in head.	7th day trephined and loose bone removed.	Recovery in 2 months.	
100	FLUHRER. Unpublished. Referred to by permis- sion.	M.		Bullet traversing left hemisphere longitudinally.	No marked cerebral symptoms, slight right hemiparesis and loss of memory.	Counter opening made in skull and bullet ex- tracted.	Recovery.	
101	ALEXANDER. <i>Med. T. and Gaz.</i> , Lond., 1884, II., 145	M.	18	Old depressed fracture just behind center right parietal bone.	Left hemiparesis, de- mentia.	Trephined at site of old injury. Bone was found enormously thick- ened.	Improved.	

No.	AUTHORITY, &c.	SEX.	AGE	INJURY.	SYMPTOMS.	OPERATION.	DRESSING.	RESULT.	REMARKS.
102	GODLEE. <i>Med. T. and Gaz.</i> , Lond., 1884, II., 610	M.	10	Fell on head. Large hematoma in right parietal region	Left hemiparesis, gen- eral convulsions, loss of consciousness.	Chloroform was ad- ministered and the res- piration soon became embarrassed. Was mori- bund when trephined.		Died.	There was found a rupture of the posterior branch of the right middle meningeal artery and a large effusion of blood.
103	KILGARRIFF. <i>Tr. Acad. Med.</i> , Ireland 1883, I., 22.	M.	Adult	Fell from horse. Received injury to head and fracture of clavicle.	Was unconscious two hours. Later complained of pain in upper right oc- cipital region. One month after injury pain in head, sleepless, irritable stom- ach.	Cut down to bone and evacuated healthy pus. Slept soundly and much pus escaped during night. In morning no pain or nausea. A punctured fracture was found just to right of longitudinal si- nus. Trephined and evacuated 15 cc. pus. In- ner table eroded.	Washed out wound with carbolic solu- tion 1-200 and dressed with lint and carbolized oil 1-40.	Erysipelas, followed by recovery.	
104	JONES. <i>Lancet</i> , 1884, I., 1026.	M.	21	Pistol wound 6 cent. above left brow, 2½ cent. ex- ternal to median line. Blood and brain substance escaped.	Had two convulsive attacks. Semi-conscious- ness. Much pain. Right hemiparesis and spasm. Later, irritability and optic neuritis. Year after injury frequent fits, pain on left side of the head. Right arm weak. Drags	13 months after injury opened the wound. Part of bullet found in bone. Internal table splintered.	Drainage tube. Anti- septic, iced dressings.	Headache relieved. Lost his irritability Hemiplegia improved. Has been six months with- out fits.	

CEREBRAL SURGERY.

229

105	ROY. <i>Lancet</i> , 1884, II., 319.	M. Adult	Knocked down with heavy stick. A linear depressed fracture at the junc- tion of the sagittal and coronal sutures.	right foot. Vision dim. Nystagmus. Photopho- bia. Internal Strabismus left eye. Exaggerated re- flexes on the right side.	Unconscious. Stertor, p. 72. Limbs rigidly flexed.	Trephined and some clot removed from be- tween bone and dura. 2nd day, conscious, but couldn't speak. 6th day, after three days of ery- sipelas, was better. Could answer by signs, but couldn't speak. No rig- idity.	Died 9th day of pneu- monia.	There was a large fissured fracture and a clot 12x7x2½ cents. on dura op- posite left temple. Coagulum on oppo- site parietal emin- ence. Dura and brain healthy.
106	BRYANT. <i>Lancet</i> , 1884, II., 823.	M. 4	Fell on head 1 metre. Scalp wound over right eye. Bone exposed and depressed.	2nd day drowsy and sick. 13th day T. 38.8°. Convulsions. Later, left hemispasm, which recur- red for hours and left patient with complete left hemiplegia. 16th day T. 39.4°, walked. 20th day had a fit, was drowsy, 22d semi-comatose. 25th T. 41°. Death.	Trephined on 13th day. Depressed bone remov'd	Terebene. Leiter's coil.	At first some im- provement. Spheres cover'd with Died 25th day greenish lymph.	Convexity and base of both hemi- spheres cover'd with greenish lymph.

No.	AUTHORITY, &c.	SEX.	AGE.	INJURY.	SYMPTOMS.	OPERATION.	DRESSING.	RESULT.	REMARKS.
107	HALSTED, <i>N. Y. Med. Jour.</i> , 1884, XXXIX., 227	M.	52	Pistol wound 6 cent. below sagittal suture and $2\frac{1}{2}$ cent. anterior to external auditory meatus.	No symptoms.	Part of bullet lodged in diploe, projecting into cranial cavity. Inner ta- ble depressed. Frag- ments extracted.	Antiseptic, catgut sutures	Recovery.	
108	PARK. <i>Four. Amer. Med. Assn.</i> , 1884, II., 325	M.	20	Bullet wound left parietal eminence. Ap- plied iodoform cotton and ice bags consciousness.	Complete right hemi- plegia. At night two con- vulsions with loss of con- sciousness.	Trephined and removed several small fragments, some being embedded in the brain. 16th day symptoms of central irri- tation. Explored brain with hypodermic needle. No pus. 19th day re- moved pieces of bone.	Compress. Naphthaline gauze.	Recovery.	
109	"	M.	38		Epilepsy.	Trephined through mastoid and punctured brain.	Sublimate solution. Naphthaline dressing.	Improve- ment.	
110	NORTH. <i>N. Y. Med. Record</i> , 1884 XXV., 693.	M.	24	Struck with club. Compound depress- ed fracture in right parietal eminence.	Unconscious first. Se- vere headache and pres- sure feeling. Raving and delirious three weeks.	Removed 13 fragments. Dura not opened.	Drainage tube, carbo- lized water, ice cap.	Recovery 54th day.	

111	"	M.	27	Head crushed by machinery. Large depressed fracture in right temporal region. Dura lacerated.	Four large fragments of skull removed.	Carbolic water. Drainage tube. Ice cap.	Recovery in 7 weeks.
112	BURCKHARDT <i>Deuts. Zeits. für Chir.</i> , 1881, Bd. 15, 5, 582.	M.	62	Pistol wound right parietal region.	Paresis and anaesthesia of the opposite side of the body. Traumatic insanity.	Trephined and inserted drainage tube in track of the ball.	Recovered.
113	FENGER and LEE. <i>Am. Jour. Med. Science</i> July, 1884, 17	M.	Adult	Pistol wound just above left eyebrow, minute rose and walked. opening into cranial cavity and frontal sinus.	First unconscious. In 5th day explored wound and evacuated 8 cc. of pus from roof of orbit. Much improved. 40th day trephined. Dura incised. Brain washed out with sat. sol. punctured in various directions and, at last, at depth of 6½ cent., pus found. Abscess was evacuated by dressing same treatment.	Antiseptic. Fenestrated drainage tube was inserted and cavity washed out with sat. sol. boracic acid. After second operation pus found and evacuated.	Recovery.

Twenty mos. later killed himself. Bundle of connective tissue along track of the ball from parietal bone to falx cerebri. Bullet found encapsulated near latter.

No.	AUTHORITY, &c.	SEX	AGE.	INJURY.	SYMPTOMS.	OPERATION.	DRESSING.	RESULT.	REMARKS.
114	KEMPER. <i>Am. Jour. Med. Science</i> Jan. 1885, 128	M.	18	Breach pin of gun, weighing four grams and 4 cent. long, entered brain just above right frontal sinus.	Slight pain.	Foreign body found 1 cent. beyond internal plate. Five or six pieces of bone were removed.		Recovery.	.
115	BENNETT and GODLEE. <i>Lancet</i> , Dec. 20, 1884, p. 1090 and Jan. 3, 1885, p. 13	M.	25	Blow on left side of head.	No symptoms for a year; then those of tu- mor of brain appeared. (See text.) Improved for 21 days, then had rigor, fever, headache, nausea, hernia cerebri. Death.	Trephine, dura open- ed, brain incised and tu- mor enucleated. (See text).	W o u n d closed by su- tures.	Death on 28th day after operation.	Spreading down- wards toward base of brain from wound was found an in- flamed area covered with plastic lymph.

EDITORIAL ARTICLES.

TUBERCULOUS SURGICAL AFFECTIONS.

De la Tuberculose Chirurgicale. Charvot. *Revue de Chirurgie*, Mai, Juin, Aout., Sept., 1884.

Des Conditions favorables ou defavorables à la tuberculose osseuse. Charpy. *Revue de Chir.*, Sept., 1884. p. 689.

Contribution à l'Etude des Tumeurs Blanches et des Abscesses Froids dans leurs Rapports avec l'Infection Tuberculeuse. Menard. *These de Paris*, 1884.

Tuberculose der Knochen und Gelenke. Prof. Dr. König. pp. 170. Berlin, 1884.

Ueber chirurgische Tuberculose. Mögling. *Mittheilungen aus d. Chirurg. Klinik zu Tübingen. Zweites Heft.* p. 248. 1884.

Ueber Drüsentuberculose und die Wichtigkeit frühzeitiger Operationen. Garré. *Deutsche Zeitschrift. f. Chir.*, Bd. XIX, Hft. 6. p. 529.

There is, perhaps, no one topic which has of late excited more study and comment among surgeon-pathologists than that of surgical tubercular affections. Moreover, the interest in it, instead of abating, is rather on the increase, if one may judge from the large amount of space devoted to it by continental periodicals and the monographs which are constantly appearing.

Reference is given to the more recent and important of these in the contributions to literature named at the head of the present article, and it is our intention, in a series of articles, to go over in review much of the ground covered by these publications, since comparatively few of our readers have access to them; partly on account of the intrinsic interest and importance of the general subject, and partly because there is not yet a standard text-book in the English language which gives anything like adequate information thereon. Proud as we are of the general work of American and English writers, we do not hesitate to make this statement, though, in our estimation, it be anything but creditable. Owing to this fact our profession at large still show, in this respect, a lamentable ignorance of surgical pathology, and our students are not taught as they should be in order that they may teach their elders. As a consequence, our general practitioners are every day ignor-

ing or mistaking lesions which are most evidently tuberculous, and thus, still worse, it results that many a patient sinks finally into his grave whose case, if properly recognized at first, might have been entirely relieved.

Pursuing the editorial policy thus outlined, we begin with a long continued paper by Dr. Charvot, one of the French army surgeons already known for his practical researches in this direction.

So little attention has been paid, in this country at least, to the subject of tuberculosis in surgery that we propose giving, first, a very brief *résumé* of its history. Following Charvot we may clearly define the following epochs.

I. PRIMITIVE PERIOD, beginning with Hippocrates ; one of shadows and great uncertainties. During this period some general truths were arrived at, such as that phthisis develops more or less directly after certain surgical accidents or diseases ; but nothing definite was known.

II. PERIOD COMMENCING WITH THE PRESENT CENTURY. — This opened auspiciously when Laennec, by a stroke of genius and profiting by the previous labors of Bayle, demonstrated the unicity of the tuberculous process and its various products—phthisis, its granulations, gray tubercle and caseous infiltration ; and that most of the lesions considered scrofulous were really tuberculous.

The consequences of this discovery were rapidly felt in surgery. Delpech studied the subject in its surgical aspects ; Michet wrote on tuberculous ostitis ; and Nélaton, in his memorable treatise on tuberculous affections of bone, applied to the osseous structure the discovery of Laennec, and showed that in bone, as in lung, tubercle may take either the diffuse or the encysted arrangement, and that many chronic suppurations of bone, known so well under the name of chronic ostitis, were due to tuberculous alterations. These views put forth by this master were rapidly disseminated by his disciples, especially so by Parise.

In 1803, Bayle demonstrated caseous foci in the epididymis and in certain lymphatic glands, and decided that they were tubercular. This was admitted half a century later by Dufour and Cruveilhier.

III. PERIOD OF HESITATION as to the acceptance of these views, especially among the Germans, who were followed a little later by most of the French authorities, and who declined to see in phthisis a peculiar

inflammation and suppuration. In this class, Broussais, Reinhardt, and Niemeyer were prominent, and, for a time too, Virchow and Rindfleisch. In caseous foci they saw only scrofulous degeneration of products of non-specific inflammation, and cold abscesses and caseous glands were regarded as the results of peculiar alterations of the chronic suppurative process.

Naturally Nélaton's views were desperately opposed by many, especially among his countrymen by Malespine (1841).

This period lasted some twenty years.

IV. THE PRESENT PERIOD OF RENAISSANCE.—Things were in the above state when Villemin, in 1865-9, showed by his now classical experiments that phthisical products were inoculable upon animals, and that caseous material was just as virulent as grey tubercle. His views were violently attacked, but were too firmly grounded to be easily shaken. Friedländer had discovered tubercle nodules in lupus; Köster, in 1869, showed that tubercle granulations were identical with the fungous masses found in diseased joints, and described the giant cells which so long, and until recently, have passed as pathognomonic of tubercle. Cornil, in 1870, corroborated him, as did Laveran later, in 1876. Since then, studies on this subject have rapidly multiplied in France and Germany. In 1879, Brissaud and Josias published an excellent memoir on subcutaneous tubercular nodules and cold abscesses. In the same year Kiener studied most carefully and described fully the tuberculous character of sub-periosteal cold abscesses. At the same time Volkmann was determining the tuberculous-osteo-arthritis nature of white swellings; showing that as a rule their points of départure were from foci in the epiphysis, infection of surrounding structures taking place slowly. His own efforts were ably seconded by those of his then assistant, Schede, now in Hamburg.

In 1881 appeared the excellent work of Lannelongue, in which is clearly set forth the tuberculous nature of those lesions just mentioned. In 1881, too, Dubar settled the tuberculous nature of certain chronic engorgements of the mammary gland, and his observations were confirmed by Quenu. During the same year Kiener made a communication to the Société Médical des Hôpitaux concerning the relations existing between tuberculosis and those common affections of soldiers.

called scrofulous. Charvot himself published, in 1882, the case of a soldier in whom a cold abscess of the cheek was followed by acute generalized deposition of tubercle in the bones. In 1883 Kiener and Poulet published their histological researches concerning tuberculosis of bone; they showed that the chronic alterations of bone to which we still give the general name caries are of a tuberculous nature, and that they may occur in a diffuse or in an encysted form, thus repeating ideas long previously enunciated by Nélaton.

Lanceraux, Coyne and Labbé, in 1873, showed the similarity existing between the fungous masses in tuberculous joints and those in tendon sheaths, and since their work the absolute identity of the two similar conditions has been made clear by the labors of Trelat, Latteux, Terrier, and Verchere, so that a tuberculous tendo-vaginitis is now a known lesion.

In 1881 appeared the thesis of Colas, in which he related how he proved the tuberculous nature of many glandular enlargements by a long series of inoculation experiments.

But the positive identification by Koch of the *bacillus tuberculosis*, in 1882, threw an entirely new light on the subject; and the confirmation of his views by nearly every observer of note, including, in France, Villemain, Cornil, Vignal, Malassez, and others equally well known, has put the parasitic nature of the disease beyond doubt, while it has given us a definite criterion by which we may say positively whether a given lesion is or is not tubercular. We look now, not for giant cells, but for bacilli.

ANATOMICAL PROOFS.—The absolute demands of pathological inquiry concerning the tuberculous nature of a given lesion are satisfied by demonstration of the following features:

1. Presence of the ordinary clinical features peculiar to such cases.
2. Presence of ordinary histological structure of tubercle, *i. e.*, giant cells, etc.
3. Presence of tubercle bacilli, as shown by proper procedures.
4. Result of culture experiments.
5. Result of inoculation experiments.

For all ordinary purposes it may be held that compliance with any three of the above five postulates will be convincing proof of the

tuberculous nature of any case or specimen. For our present purpose it is not deemed necessary to here go over at length the many investigations by which this question of the unity and identity of the tuberculous process have been put to the test. They are to be found in the many journals and monographs of the past few years. We will only say that the more severe the tests in skilled hands the more convincing have been the demonstrations. That local tuberculosis may follow traumatism is well known, but it is equally well known that the diathesis must precede the injury; the accident merely provoking, as it were, an outbreak in a constitution peculiarly susceptible to such irritation.

EXPERIMENTAL PROOFS.—If in spite of ordinary histological structure, and the presence of specific bacilli, there be those who still doubt the actually tuberculous nature of lesions now under discussion, the proof by experiment—*inoculation*—may certainly be considered finally demonstrative. By the admirable discovery of Villemin, confirmed by numerous observers, it was shown that tubercle from various viscera could be inoculated upon different animals, and that the products of the affection thus caused could cause in yet other animals a more or less general tuberculosis. This test is as valid to-day as ever, but can be made even more so by practicing inoculations in series, *i. e.*, from animal to animal. Martin has particularly shown the great value of this test. This has been carried out more thoroughly in the matter of fungous arthritis, perhaps, than for any other destructive lesion.

In 1878, Max Schüller noted that *in scrofulous subjects* traumatism of joints seemed to determine very easily the tuberculous lesion known as tumor albus, and decided to investigate the matter experimentally. Causing healthy animals to ingest or inhale tuberculous matter, he then inflicted various bruises or injuries about their joints. Around every joint injured under these circumstances there developed that lesion known best as tumor albus, and presenting its proper peculiarities on anatomical investigation, while the animals rapidly succumbed to general tubercular infection. These researches are now historical, and their value enhanced rather than diminished as they have been repeated and varied. The tuberculous matter with which inoculations have been made has been taken from various sources: from fungous joints, from enlarged glands, and even from lupus nodules, and with invariably the same result.

In 1879, König showed that inoculation of granulations from a tumor albus produced a generalized tuberculosis in the rabbit. About the same time, Hueter made a series of experiments, from which he concluded: 1st. Inoculation of tubercular products directly into a joint causes the formation of a classical tumor albus. 2nd. In the same way general infection is also set up. Experiments, to this same effect, have been made in France by Lannelongue, Kiener and others.

The pathogeny of tubercular adenitis has been proved in a similar manner and by numerous observers. By this experimental method Cohnheim determined the identity of scrofulous and tuberculous adenitis. More lately, 1881, Colas, by a series of experiments vigorously carried out, has made this very clear and positive; he inoculated upon eleven animals material taken from enlarged cervical glands of children, most of whom had an inherited diathesis. Of these eleven, three died of sepsis, but the eight others showed, in from fifteen to sixteen days, generalized tuberculosis, with typical caseous nodules at point of inoculation. In another series Colas got the same result with material taken from the glands of phthisical subjects and from various localized tubercular lesions, such as pus from cold abscess at angle of jaw, pus from a congestion abscess, granulations from a spina ventosa, etc. Charvot and Kiener have had like results with material from various other tubercular material.

And, as if to independently confirm all inoculation experiments, Koch has arrived at exactly the same conclusive results by another experimental method, viz., by cultivation of the bacilli which all this tubercular material contains, taking material not only from the lungs, but from all sorts of sources, providing only that they were tubercular.

CLINICAL PROOF.—Exact clinical observation, without furnishing us as rigorous tests as the experimental method, has got much about it to make it of the greatest value for our present purpose. Close and prolonged watch of a case such as was formerly designated "scrofulous" will almost always be rewarded by discovering, sooner or later, its truly tuberculous nature. The general appearance of such cases, the evolution of the lesion in question, the tenacity of the local lesion, and especially its later generalization, all show plainly the infectious nature of the same.

Charvot has generalized certain principles which are too important to be overlooked, and which we summarize thus :

1. It is impossible to distinguish clinically between external localized tubercular lesions occurring in phthisical patients and similar ones, which used to be designated as scrofulous, occurring in individuals healthy in appearance and without phthisical trouble. Their appearance, evolution, progress and their infectiousness are the same. Were not this impossibility recognized we should be compelled to acknowledge a tubercular phthisis and a scrofulous phthisis, which scarcely anyone since Bazin has been willing to do.

2. Any or all of these more external lesions may be complicated at any time with visceral tuberculosis. Morton considered these coincidences too frequent to sustain any other relation to each other than that of cause and effect. Laënnec considered pulmonary phthisis as very common among scrofulous individuals. Louis considered these latter more predisposed to it than any others. Marjolin and Lebert, like every other observer, have emphasized this. Moreover, the pulmonary lesion is not always of the chronic form, such as the term phthisis would imply ; not rarely the trouble resolves itself into an acute miliary tuberculosis, involving other viscera besides the lungs.

3. Many or all of the caseous lesions, some of which have long been recognized as tuberculous, and others held formerly to be scrofulous, appear simultaneously by fits and starts, or alternately, on the same subject. Among the former, caseous epididymitis, tuberculosis of the genito-urinary tract, subcutaneous tuberculous nodules, vertebral osteitis, etc. When other lesions appear along with these, and run a clinically parallel course, it is not illogical to consider them identical in character.

4. The surgical affections which have been called scrofulous present every characteristic of an infectious nature. Some of them have even been considered truly malignant by competent observers.

5. All etiological influences apply equally well to tuberculous and scrofulous lesions — heredity in particular. Furthermore, as we acquaint ourselves with the family history of these patients, we shall find that consumptives beget scrofulous children and scrofulous patients beget consumptives, interchangeably.

CLINICAL CONSIDERATIONS.—Clinically, surgeons have to deal with tuberculosis as it appears in the following classes of cases, as arranged by Charvot:

1. Cutaneous tuberculosis—well-known—lupus being perhaps the best example.
2. Tuberculosis of mucous surfaces; ulcerations of the tongue, mouth, larynx, intestine, anal fistula, etc.
3. Tuberculosis of subcutaneous or intermuscular connective tissues—nodules, cold abscesses, etc.
4. Periosteal tubercular nodes, known as sub-periosteal cold abscesses (Duplay), chronic periostitis (Follin), periostitis externa (Gaujot), and chronic suppurative osteo-periostitis.
5. Various forms of tuberculosis of bone, known commonly as caries, necrosis, chronic ostitis, scrofulous ostitis, etc., which lead to the formation of so-called "congestive abscesses" and "wandering abscesses."
6. Tuberculosis of joints, the common tumor albus, fungous tendosynovitis or tendo-vaginitis.
7. Tuberculosis of the genito-urinary tract—testis, epididymis, cord, prostate, bladder, uterus, ovaries, etc.
8. Tuberculosis of glands—the various chronic, caseous or suppurating forms of adenitis.

Without stopping to go over each lesion in detail, we may say that tuberculous ulcerations of mucous membranes are now known to be not infrequent; those occurring in the nose and causing the so-called scrofulous ozæna have been studied by Riedel, Weichselbaum and Laveran; those of the tongue by Laveran, Bucquoy, Nedopil, Trelat; those about the anus by Péan, Fréréal, Molieré and Esmarch. Tuberculosis of the choroid is also now well known; less so in the iris and other parts of the eye.

Tuberculosis of the mammary gland was long denied, or its possibility contested, but its existence has been placed beyond doubt by the studies of Ledentu and the thesis of Dubar; in fact, the latter deserves the credit of having first shown that, in the mammary as in the seminal glands, or in other organs, tubercular lesions present themselves as isolated or confluent nodules, and that softening occurs in the ordinary way, extending from foci.

In fungous tendo-vaginitis, as in fungous bursitis, the investigations of Lanceraux, Coyne and Labbé, Trelat, Terrier and Ch. Nélaton made clear the presence of giant cells in the granulations, long before their tubercular origin was put beyond doubt by finding bacilli.

In the matter of tuberculosis of glands, discussion has at times waxed quite warm. Since the labors of Bayle, Laënnec and Lebert, from the beginning of this century, scarcely anyone has doubted the existence of a form of tuberculous lymphadenitis, which shows particularly well in those suffering from phthisis. As far as concerned internal glands in connection with viscera, controversy was impossible; but, with regard to the more superficial glands, only those which enlarged *pari passu* with the progress of a phthisis were generally regarded as tuberculous. Other glandular enlargements—apparently spontaneous—had been regarded as “scrofulous,” although under the microscope no difference of structure was made out. Now, a host of observers are ready to testify that such distinctions are illusory: Thaon (1873), Colas (1881), Schuppel, Humbert, Mögling, Treves, among others, have brought forward abundant evidence of the genuinely tuberculous nature of so-called scrofulous glandular enlargements.

In tumor albus it was Köster who first discovered the giant cell in the miliary nodule, in 1869.

In this connection, we might incidentally mention that Schuchardt and Krause have examined specimens from forty tuberculous cases in Halle and Breslau clinics; they comprised:

Synovial tuberculosis	-	-	-	-	10 cases
Osseous	“	-	-	-	3 “
Glandular	“	-	-	-	3 “
Cold abscesses	-	-	-	-	14 “
Tubercle of muscle	-	-	-	-	1 “
“ tongue	-	-	-	-	1 “
“ testicle	-	-	-	-	1 “
“ female genitalia	-	-	-	-	1 “
Miscellaneous	-	-	-	-	6 “
Total	-	-	-	-	40

In every one of these cases they found the characteristic bacilli.¹

¹ *Fortschritte der Medicin*, May, 1883.

PATHOLOGICAL ANATOMY.—For facility of description we may, with Charvot, divide the stages of the infectious process into four:

1. Known as that of tubercular infiltration. During this the primary tubercular elements appear, by whose union is formed the gray granulation of Laënnec (miliary), and which infiltrate the tissue *en masse*. Under this source of irritation the tissues proliferate and form a more or less pultaceous mass of variable consistence, with the appearance of a gumma.

2. Caseous or puriform degeneration, whose products vary in consistence from that of pus to that of chalk; this usually amounts to the formation of a cold abscess.

3. Elimination or absorption of these products of degeneration; often equivalent to the formation of cavities, fistulæ, ulcers and fungosities, the latter often being due to excess of suppurative effort.

4. Reparative stage, equivalent to one of cicatrization.

These stages have no fixed limits of duration, and are very variable, being oftentimes more rapid in one place than in another. Thus an individual may succumb from rapid involvement of a vital organ before the disease has advanced to nearly the same comparative extent in other parts.

I. *Period of Infiltration*.—Tuberculosis of mucous surfaces accessible to the surgeon begins by nodosities, in very limited patches (circumscribed), and by layers of diffuse infiltration.

Tuberculosis of subcutaneous or other inter-muscular connective tissue takes for the most part the circumscribed form of tubercular gummata, well described by Josias and Lannelongue.

Tuberculosis of periosteum commonly occurs in caseous masses, varying in thickness and extent, or in isolated masses of the size of a hemp seed. They form, for the most part, in the deeper layers, where there is greater vascularity. By pressure they assume a discoid shape.

In the genito-urinary tract, as Cruveilhier long since showed, there are two favorite sites for the formation of tubercle, *viz.*, the prostate and the epididymis, the testis being in the immense majority of cases only secondarily involved. In the cord the process usually goes on more slowly, by preference at the extremities.

Less frequently tubercles are found in the membranous portion of the

urethra, or diffused in other parts of the surrounding organs. Moreover, bilateral affection of the epididymis is not rare. These latter organs, enveloped in a fibrous covering, are involved in whole or in part. In the circumscribed form of trouble one finds isolated foci which, as Reclus has shown, are not found in the head any oftener than in other parts.

In the diffuse form it is infiltrated throughout, is enlarged, hardened, surrounds the testis to more than the proper extent, and can be felt to have a bosselated surface, perhaps slightly fluctuating at points.

In the testis the appearances are variable, but analogous to these in the epididymis. Owing to the peculiar structure of the glands we shall find, in the circumscribed form, a series of minute pearly translucent granulations of millet seed size, either scattered at random or ranged in concentric lines about the Highmorian body.

Tuberculosis of the vas deferens takes the form of nodules arranged along its length from the tail of the epididymis, and extending even nearly to its termination. It seldom happens that the canal is equally and regularly affected and tumefied throughout, as in ordinary funiculitis.

Tuberculosis of the prostate and seminal vesicles does not differ essentially from that spoken of above. They also are enveloped in a fibrous coat; their glandular folds are hardened and thickened by the morbid process, much as when they are injected with tallow. Sections of a diseased prostate show miliary granulations and caseous nodules intermingled. Disease of the prostatic portion of the urethra is almost always secondary.

Tuberculosis of the mammary gland presents the same mode of development as in the seminal vesicles or in other glands. Some years ago Velpeau, Johannet and Nélaton proved the possibility of its occurrence, though without producing conviction in the minds of many surgeons. But recently Dubar has described two varieties of mammary tuberculosis, and the observations of Ledentu and Quenu confirm those of Dubar.

The first variety consists of isolated tuberculous foci, and had already been observed by Velpeau and by Billroth. Sections in different directions show them distinctly; in size they may attain even to that of an

almond; they are of grayish-yellow color. Under the finger they have considerable color, being sometimes friable, sometimes softened in the center, but seldom so soft as to be fluid. In other words, tuberculous foci in the parenchymatous mammary tissue yielding slowly to caseous degeneration, acting as irritants to an extent sufficient to become encapsulated.

The second variety corresponds to tubercular infiltration. The breast doubles in size, the swelling is not regular, some particular point becomes more prominent. Around its borders fistulæ form. Under the finger the gland has a bossed, nodular feel; but in the least swollen parts one can distinguish little nodules slightly movable. On section, there are found in the parenchyma of the gland granulations (miliary, of a size of .01-.02 ctm., easily seen with a loup), infiltrations and irritative, *i. e.*, proliferative lesions. It is not yet positively made out whether the morbid process begins in the epithelium which lines the secreting portion of the glandular tissue, or in the areolar tissue which cements together the gland elements.

Tuberculosis of lymph glands: In these the initial alteration presents certain peculiarities which make it at first less characteristic, and may thus mask its specific nature. In many cases the gland swells, hardens, and presents on sections gray granulations, which contrast with the reddish lymphatic tissue. When these do not appear so prominently, the tissue, under the microscope, will seem studded with giant cells and specific follicles; the infiltration will then be less evident to the naked eye than when caseous masses appear.

But it is in *bone* that it is most easy to study tuberculous processes from their inception. Ever since Nélaton threw upon them such a flood of light, they have been described under two heads, and the lesions spoken of as encysted and infiltrated. The encysted was first properly recognized, and is less contested now by those not *au fait* than the other form, partly because it lies open to demonstration with the naked eye. These develop in the osseous—usually the cancellous—tissue grayish granulations, fusing into grayish masses, having fibrous envelopes separating easily from their surroundings, gradually congesting around the periphery. They do not join, at first, but remain sometime separated by the osseous trabeculæ. But these partitions rapidly dis-

appear, the tubercles agglutinate together, thus forming masses which are not slow to succumb to caseous degeneration.

The other variety of tuberculosis of bone is the circumscribed infiltration, corresponding to Nélaton's 'semi-transparent,' or 'puriform,' or 'opaque' infiltration. On section, one sees larger or smaller gray-tinted opaline plates. This variety is characterized by a gradual uniform progress. Kiener and Poulet have described a third variety, a diffuse infiltration, in which the alterations are practically the same, but in no way circumscribed, and which may invade an entire epiphysis. Its progress is more marked and with the accompanying destruction of tissues is more rapid. It consists of innumerable giant-cells scattered everywhere.

Tuberculosis of joints may be primary or secondary. It is primary when it begins in the synovialis and invades in succession the cartilages and the bone; secondary when the infection is by the opening into a joint of a focus in the epiphysis. Parise, of Lyons, and Volkmann have had the incontestable merit of showing that most every tumor albus originates by development of such a focus in the cancellous structure of an articular extremity. When primary, the lesions assume one of the following forms:

- a. Circumscribed, fungous, pale, gray granulations, forming slowly.
- b. Infiltration of the synovialis by layers.
- c. The very acute form known as miliary; the synovialis is dotted with granulations which have not had time to evolve further. The local affection is rapidly followed by general infection.

Tuberculosis of the eye has been of late years carefully studied by ophthalmologists. By aid of proper optical appliances it has been possible to watch the development of tubercular processes set up within this organ, either spontaneously or intentionally, and the pathology of the subject has been thus materially cleared up. In the eye also tuberculosis may be primary or secondary. Numerous observers have made it sure that there may be a purely local primary lesion in the interior of the bulb, and that if enucleation be made in time, general infection may be avoided. The two most vascular structures of the eye, iris and choroid, suffer most often. In the former, it shows by little grayish buttons in its folds and around the pupillary border. By experiment, it can

be shown that these little buttons are preceded by a local hyperæmia, giving the spot a reddish shade. In the choroid this process has been known a long time, though it is less often primary here, and is harder to discover than in the iris. The appearances are the same as in the iris. Secondary lesions most often follow some process in the conjunctival sac, or in the meninges; in the former case, some perforation of the cornea or sclerotic having occurred. Tuberculosis of the retina is oftener secondary than primary.

II. *Period of Caseation or Degeneration.*—From its inception the tendency of any tuberculous lesion is toward degeneration, this always beginning in the center and advancing toward the periphery. The formation of the long known cold abscess being the most common result of tubercular infiltration, it behooves us to study it a little in detail. The resulting purulent fluid bears much resemblance to ordinary pus, and used to be called "ill-conditioned" pus. The contents of a cold abscess have usually a fluid consistence, with certain yellowish or whitish fragments looking much like pieces of cheese; these latter are portions of the original caseous mass which have become detached from the abscess walls and mingled with the fluid, and broken down still more.

Remnants of blood clots are not infrequent, and are of a dark color. Under the microscope are found numerous altered blood corpuscles, granular matter, fatty substances, cholesterine crystals, and all sorts of debris.

The abscess sac constitutes a more interesting subject for study, since it is really the living part, its contents being only products of decay. It is usually distinct and easy to dissect out, whether for anatomical or therapeutical reasons. It presents for study an abscess surface, a wall and a surface in contact with more or less normal tissues. The former is variable in appearance; while now and then smooth and glossy, like a cyst wall, it is commonly uneven, presenting rugosities, bridges, bands or shreds, of all forms and colors, not so very different in appearance in this former respect from the cavities of the heart; extended by *culs de sac* and secondary cavities. It is lined or, so to speak, carpeted by a caseous layer, more or less easily detached, the "pyogenic membrane" of many writers. One may find also vessels and nerves running through its cavity, these being more capable of resisting the tuberculous infec-

tion. Very often the cavity is multilocular, the various portions connecting together by larger or smaller channels.

The structure of the wall has not long been well known. On section, under the lens, it consists of cellular tissue, freely traversed by capillaries, studded with tubercles in all stages of evolution, tending to break down as the abscess surface is approached, and by their softening and melting down forming new cavities, which shall slowly enlarge and connect with the large one. Toward the outer side of the wall fresh, living tubercles are seen, which have all their ordinary histological characters. Elementary tubercles are often distributed for some distance through otherwise healthy tissues. The finest blood vessels, as they approach the abscess surface, undergo degenerative changes which they cannot resist, and by their final rupture pour more or less blood into the cavity.

The outer surface of this wall, that looking toward the surrounding tissues, is often indistinguishable, being blended with them; but at times it is so well marked as to permit enucleation of the whole sac. At times, certain projections pass into the neighboring parts, binding it firmly in place and thus sowing the seeds of tubercle more widely.

The above description applies to cold abscesses forming beneath the skin, in the intermuscular spaces and in the thickness of the periosteum. In glandular tissue (breast, testicle, etc.), the result of circumscribed tuberculosis is to the same effect, namely, formation of cold abscesses. The aggregated miliary formations and the caseous foci undergo cretaceous changes, and then soften. In the case of lymphatic glands the same process occurs, and is often complicated by peri-adenitis, by which they are all the more firmly encapsulated and thus protected.

In bone, the process is the same, only modified by the surroundings. In the encysted form of tubercle of bone, the agglomerated mass of gray tubercles is not slow to caseate. Should we now make a section, we should find, as Nélaton long since wrote, a closed cavity containing whitish or yellowish cheesy matter, of consistence of putty. This cavity resembles a cyst with irregular internal surface, the walls often impregnated with tubercle close to the outer surface, adhering to its osseous bed by a vascular net work. The spongy tissue around it is hyperæmic, but otherwise normal. In the circumscribed infiltration of bone,

the affected portion assumes a yellow color, this discoloration being limited by the borders of the lesion; the bony trabeculae undergo considerable consolidation and thickening. All this portion of bone thus infiltrated is doomed to certain death. If it dies and loosens in one piece, as it commonly does, we shall have a sequestrum which sometimes will retain its condensed and even ivory-like structure. It lies in a cavity filled with pus, and causes one form of bone abscess. In the diffuse infiltration, the local disease extends so rapidly that there is no chance for the formation of a circumscribed abscess. If the surgeon does not quickly interfere the patient dies from diffuse suppuration.

In articulations affected with primary synovial tuberculosis the result is the same, *i. e.*, cold abscess, though the process is slightly different. The fungous masses, barely formed, soften, and the joint is thus filled with caseous masses, granular and fatty debris, and a purulent liquid; from the latter is gradually deposited upon the joint surfaces a layer of yellowish material resembling cheese. Along with this occurs a thickening and induration of the synovial and peri-synovial tissues for a considerable distance. The epiphyses which are thus surrounded by a softened tuberculous mass are not slow to partake in the process and present deep lesions; their articular covering disappears, and the bone ends are roughened, in whole or in part, by fungosities. The neighboring spongy tissue next succumbs to the same tuberculous process, presents fungosities similar to those in the joint cavity.

All this constitutes the articular cold abscess (*abcès froid articulaire*) of Bonnet.

III. *Period of Elimination or Resorption.*—Tuberculous changes, when not tending to destroy life, may follow one of three causes:

a. Resorption.—In these too rare cases, the intensity of the virus is small and is rapidly exhausted. The results of softening are absorbed, the surrounding tissues preserve their vitality, they proliferate in order to repair the loss of substance. In the tuberculous follicle the wandering cells organize a fibrous tissue. In the miliary granulation the change is the same. This form, *which corresponds to the fibrous phthisis*, occurs most often in the lymphatic and seminal glands, and in the former is not rare. Cruveilhier and Reclus have described cases where the glandular tissue of the testis has been entirely replaced by these

fibrous masses and contracted into a shrunken stump. Or this fibrous phthisis may occur around the periphery of a depot of softening, in which case a fibrous envelope is formed, and a cyst thus constituted. This will show little or no trace of its former nature. Nélaton has described these in bone, and Lannelongue has found them sometimes in the periosteum, where they deceive most practitioners.

b. Mummification.—Tuberculous products which do not disappear by absorption or elimination sometimes persist indefinitely in the tissues as caseous or cretaceous masses, either encysted or scattered through the tissues. These are not infrequently found in the testicles, prostate, glands, etc.

c. Elimination.—The most common fate of these dépôts is the formation of a cold abscess, which when once formed breaks down the neighboring tissues, and finishes by opening a path to the outside of the body or into one of its natural cavities. In other words, the migration is made by a continuation of the same softening process which determined its formation. The exact laws which govern its march may not yet be fully recognized, but it is plain that it breaks its way along the cellular tissue, which, on account of its lymphatics, it is easy to infect, separates muscles, and finally presents under firm aponeuroses like the fascia lata, through which and the skin it may ulcerate at last. Only the large vessels and nerves have power to resist its encroachments—as in the psoas abscess. By this process are formed fistulæ, sinuses, cavities and ulcers.

IV. *Period of Repair—Cicatrization*—When this fortunately takes place the lesion ceases to be infectious or virulent; it assumes the character of a non-specific lesion, and the solution of continuity is repaired, just as under any other circumstances.

ETIOLOGY.—PREDISPOSING CAUSES.

a. Age.—Tuberculosis certainly is most common in early life; beyond the thirtieth or fortieth year of life it is more rare, but still not exceptional. A so-called “senile scrofula” has been described by some authors, which is nothing else than a tuberculosis of old age. Adenitis and tuberculous gummata, ostitis and tumor albus, are most frequent in childhood; tuberculosis of the genito-urinary tract in adolescence and old age. This is all explained by the order of development of the respective parts affected.

b. Sex.—According to Lebert, scrofulous affections are a trifle more common among females than males. Chandelux found this to be the case with fungous synovitis.

c. Temperament.—But little need be said in this respect, the "lymphatic" temperament being perhaps a predisposing cause.

d. Heredity.—This exerts an undeniable influence, as has been for centuries recognized. So universally is this accepted, that it is scarcely necessary to even allude to it. Even in the foetus, fungous disease has been noticed; while the observations of many veterinarians prove that among animals tuberculosis is directly transmissible by inheritance, and that the foetus is often affected during its intra-uterine life.

e. Hygienic Conditions.—All those bad surroundings which result from poverty are to be regarded as predisposing causes, inasmuch as they lead to malnutrition. Veterinarians find the same in badly lighted and ill-ventilated stables. Imprisonment exerts no small influence in this direction. In fact, prisons are too often dépôts for tubercular infection; military barracks are not much better. For a long time military surgeons have noted the progress of cold abscesses among patients in army hospitals.

EXCITING CAUSES.—These are too often clinically inappreciable, hence the disease appears to have a spontaneous origin. But, by careful observation, it is often possible to determine that the outbreak was preceded by some irritation. And of all irritations the most frequent by all means is traumatism, either as a contusion, laceration or dislocation, which causes interstitial hæmorrhage, and is followed by inflammation of low grade. More severe injuries less often lead to this result. The experiments of Schüller have taught us the same respecting animals. For centuries it has been noted that sprains were often followed by white swellings. So everyone who has studied the etiology of tuberculous testis has spoken of the injuries to which it is so easily exposed.

Next to traumatism, as exciting causes, figure chronic inflammations. So in tuberculous suppurating glands, *e. g.*, those of the neck, which are so common, we must note the precurrence of dental caries, gingivitis, pharyngitis, facial eczema, otitis media, etc.; and tuberculosis of the genitals not infrequently follows urethritis or cystitis. How to account for this clinical fact is a matter of no small interest. Ver-

neuil's explanation is an ingenious and by no means improbable one: "This auto-inoculation is a physiological act by which it happens that a parasite circulating at liberty in the blood or lymphatic current leaves the vessels, by the help of an injury to the same, penetrates into areolar spaces or the parenchyma of tissues, and there develops without hindrance." Inflammation, resulting from the trauma, brings more blood to the part, and consequently more parasites. Further, by vasomotor paresis, stasis occurs, and the conditions necessary for the lodgment and growth of the germs made all the more favorable.

These pathological views are in accord with the histological finds which have demonstrated the tubercular elements at their point of origination in the vessels as a tuberculous endarteritis (Cornil, Martin, Kiener).

But there is yet another way of viewing the matter, by which the original focus of infection may be compared with the chancre, general infection following later. Primary tuberculosis of the genito-urinary tract may be the result of contact during certain depraved sexual acts (Verneuil); the first glandular induration or implication that occurs being due to the transportation of bacilli absorbed during contact with the solution of continuity in the buccal or other mucous membrane.

SYMPTOMATOLOGY.—Still following the general grouping of the lesions adopted in considering their pathology we must speak first of the symptoms of

Period I.—Induration, characterized by pain, fixed and limited, functional troubles and swellings, only appreciable in regions accessible to exploration.

Progress at first insidious. Much depends, for diagnostic purposes, on the region involved. In the eye the trouble can be watched almost from its inception. In the subcutaneous tissue, superficial glands and periosteum, the tuberculous nodule soon becomes appreciable. But in the deeper regions, especially in the spine, it may be some time before it can be recognized.

The first significant symptom is pain, variable it may be, but easily located when felt, never sharp and lancinating, but dull and heavy, as in coxitis or Pott's disease. Along with the pain tenderness on pres-

sure can be usually evoked. As is well known, the pain may be a referred one (as in the knee pains of coxitis), but the tenderness will give exact information as to the seat of the lesion. And when this is in bone the pains assume the peculiarity which has led to the designation "starting," and are noticed frequently at night.

Functional troubles are often vague and may be lacking. They assume special importance in cases where the lower extremity is involved, or the spine.

Swelling of the diseased parts is the first tangible sign; it develops without phlegmonous reaction, is indolent, and has an œdematous consistence when in soft parts. These enlargements are most characteristic when occurring under the skin, and bear such a resemblance to syphilitic gummata that Brissaud and Josias have aptly termed them tuberculous gummata. Tuberculosis of bone is not at first marked by appreciable swelling, but it is usually accompanied by sympathetic or tuberculous periostitis, and it is this swelling which gives to the fingers the sensation as if the bone were enlarged.

The above signs and symptoms hold good in the great majority of cases, yet it very exceptionally happens that the commencement of the disease is marked by most acute phlegmonous symptoms which may deceive the most expert. Then, after a few days, usually after evacuation of caseous contents, all phlegmonous reaction subsides and the lesion takes its usual course. As Reclus has shown, this is not so very rare among affections of the testicles, while Polosson and Chandelux have described the same thing in the joints.

Period II.—Caseous softening; cold abscesses. The latter have been exactly and carefully described by authors for centuries under the names scrofulous, idiopathic, migrating, congestive, etc.; and modern discoveries have only shown their exact nature. Subperiosteal abscesses give to the finger a sensation like that given by a cephalhæmatoma, extremely soft in the center and firmer around the periphery, owing to an irritative hyperplasia of the periosteum. These abscesses once formed tend to increase slowly and then empty themselves. When the purulent collection is restrained by a capsule, as when glands have been involved, the volume hardly changes.

The work of elimination is sometimes accompanied by irritative or

inflammatory reaction in the surrounding tissues, which, for the time being, change the aspect of the trouble; "the abscess has become angry" the ancients used to say. These reactionary phenomena sometimes reveal a peritubercular inflammation, and it is not rare to notice a general febrile movement for a few days. Along with this goes an ulcerative process by which elimination—"pointing"—is accomplished.

Period III.—Sinuses, cavities, ulcers. This period is marked by the formation, according to depth and location of main lesion, of sinuses, cavities, and ulcers. Their variety is indescribably great. The sinus mouths and the ulcers are usually marked by those fungous appearances which are now considered so distinctive, especially when the sinus leads down to bone; these bleed at the slightest touch. The discharge from these fistulæ is usually distinctive; it is serous, colorless, slowly coagulating, looks much like mucilage; it is seldom large in amount; it is seldom really purulent; when purely purulent some inflammatory complication is to be suspected. These characters, to be sure, it only assumes after being established a certain length of time. Sometimes it floats out little whitish masses looking much like particles of cheese. These prove the tuberculous degeneration of the deeper parts. Sometimes, too, when the sinus is connected with diseased bone, little bony particles, minute sequestra, are passed out in this same way.

Period IV.—Recovery, or dissemination and death. After having existed an indefinite length of time, the tuberculous process may tend toward recovery, and this happy termination may be sometimes hastened by surgical intervention. But in order that this happen the focus of the disease must not be in so deep an organ as the spine or visceral glands; in other words, no vital organ must be involved. It is simply their situation which gives certain tuberculous affections their gravity.

Convalescence occurs by a transformation of a tubercular lesion into one of a non-specific nature by processes already mentioned. But it should be remembered that this sort of cicatrization is rarely absolute and final from the outset; recovery usually means a series of alternate closures and openings. This again makes still clearer the infectious nature of the original lesion. One often sees, after an apparently thorough and radical operation, the wound filling up with healthy granula-

tions, which later take on an unhealthy nature, and finally become a distinctive tuberculous ulcer. Often the new skin puts forth from the edges as if trying to cover the ulcerated surface, when pus or granulations perforate from beneath and either break it all down again or give it a sieve-like appearance; or, lastly, everything heals except a most minute fistulous track. These cicatrices, when once formed, possess certain appearances which mark their identity often for years or for life. Purplish and livid, shallow or deep and shrunken, they contract adhesions with the underlying parts, thus it happens that they often adhere to the bone or periosteum. The obliterated fistulous tracks have a cord-like feel, by which they may be followed for considerable distances into the soft parts; this is especially the case after caseating epididymitis.

Dissemination, local or general.—No tissue in the body can always resist the encroachments of the disseminating process, even the coats of the large vessels, usually so resistant, can not always be relied on. Thus in the direction of local dissemination, for example, in the course of a suppurative osteo-arthritis at the hips (third stage of coxitis) fistulous perforation of the groin, with perforation also of the peritoneum and intestine and final erosion of the external iliac artery with sudden and fatal hæmorrhage, has been known.

Aside from this local extension, remote dissemination is too often met with. The mechanism by which this takes place it is sometimes impossible to determine. Often it is by way of the lymphatics. Velpeau and Dubar have shown that tuberculosis of the breast can accompany or follow similar trouble in the axillary glands. Infection of internal glands is a very frequent complication of internal lesions, *e. g.*, the bronchial glands in phthisis. In these cases the causes of infection are arrested in the first lymphatic gland met with, just as in the case of the chancrous or chancroidal bubo. Lannelongue has observed in children with spina ventosa the development of tuberculous glands along the forearm and arm. In other cases the infection doubtless occurs by way of the veins, as Weigert has shown; tubercles forming on the inner surface of the venous walls, and then being swept loose by and into the blood current to be lodged somewhere else, as chance may dictate; in other words a tubercle-embolism. In other cases absolutely no explanation can be given.

Finally, when this dissemination becomes thoroughly generalized, we have those cases of acute general miliary tuberculosis which carry off patients with amazing rapidity. If we reckon up the total number of cases of tuberculosis, by all means the most common of all diseases, the percentage of deaths in surgical cases from this particular cause is gratifyingly small. The circumstances which especially conduce to fatality in such cases are:

1. Situation and extent of the disease such as to make repair impossible, *e. g.*, Pott's disease, coxitis, extensive cold-abscess. In these cases patients die of exhaustion.
2. Lesions of vital organs; *e. g.*, the viscera.
3. Hæmorrhage caused by ulcerations of great vessels.
4. Dissemination to the internal glands or viscera from external lesions.
5. Acute miliary infection.

DIAGNOSIS—It has already been noted that, in the beginning, surgical tuberculosis is not seldom accompanied by inflammatory phenomena, which may make accurate diagnosis impossible, especially if no history of precedent tubercular lesions can be obtained. Before objective features are manifest diagnosis is, again, often difficult, since pain may be ascribed to neuralgia (pleurodynia, sciatica) or to pleuritis or to syphilitic infection.

Functional incapacity or synovial effusion may distract attention from epiphyseal disease and lead to a diagnosis of articular or tendo-vaginal trouble. The swelling, even, which is usually so distinctive in accessible regions may be a source of yet other errors; it may have to be differentiated from:

- a.* Simple inflammatory engorgements. A gland may swell on account of inflammation in its neighborhood, and who can tell on the instant whether it will prove a purely inflammatory affair or the inception of a tuberculous process? So, after a contusion, induration may occur in the breast, the epididymis, the periosteum, and diagnosis again be impossible except by aid of lapse of time.
- b.* Benign tumors. Fibrous tumors have a firmer consistence than tubercular foci or nodules, and seldom soften, as do the latter. Lipomata are softer and give a characteristic sensation to the fingers.
- c.* Malignant tumors. Even here errors are more frequent than

some would suppose. Each may be accompanied by a cachexia which it may be impossible to identify. Osteo-periostitis (tubercular) of the rib has often been mistaken for sarcoma.

d. Syphilitic gummata. Between these and the tubercular there is, as already mentioned, more than one resemblance, and it may require a course of anti-syphilitic treatment to bring out the differences.

TREATMENT.—The methods of treatment suitable to the character of the troubles under consideration may be summed up under five headings, brief mention of which must here suffice.

1. Expectancy.
2. Destruction of the tuberculous focus by fluid or solid caustics.
3. Curetting or scraping out the sinus, abscess or cavity.
4. Extirpation of the tuberculous focus; enucleation, resection.
5. Amputation of the limb or organ affected.

These plans will be pursued in the order above given just in proportion as we learn that surgical tuberculosis is not an incurable affection. That this is a fact many cases of recovery teach us.

ROSWELL PARK.

CHARCOT'S DISEASE.

A discussion on Charcot's joint-disease occupied the attention of the London Clinical Society during three of its meetings, November 14, November 28, and December 20, and the greater part of a fourth, December 23, 1884. A comprehensive abstract of the addresses delivered will be found in the Department of Proceedings of Societies in the present number of this journal. In addition, a brief analysis and comparison of the views elicited will be of service in enabling the reader to come to a conclusion as to the permanent results of the discussion.

In opening the discussion, Mr. Marrant Baker proposed five questions for the society's consideration.

First. Is the disease new? This question was answered in various ways by different members. Sir James Paget considering that if not actually a new malady it was a new compound of diseases, and based this conclusion on the fact that numerous able observers, from John Hunter down to Stanley, had collected diseased bones with the utmost

diligence, but had not preserved a single specimen of Charcot's disease. Others, amongst whom was Dr. Ord, saw no reason for making it a separate disease at all, whilst Dr. Pye Smith and many others denied the possibility of proving any disease to be new. Mr. Howard Marsh answered Sir James Paget's argument by remarking that, as Sir James Paget had himself continued the collection of bone specimens, at least till 1865, and was as unlikely as Stanley to have overlooked the disease, we were brought to the conclusion that the disease had not existed more than twenty years, which he (Mr. Marsh) thought an untenable position.

Mr. Clement Lucas suggested that curators selected typical specimens, and that all specimens of Charcot's disease might have formerly been rejected as not typical.

The second question—What are its alliances, if any, with rheumatic arthritis? brought out an even wider difference of opinion. Several members, amongst whom were Sir James Paget, Prof. Humphry and Mr. Morrant Baker, thought that the disease was probably chronic rheumatic arthritis modified by locomotor ataxia. Others, notably Mr. Hulke and Dr. Pye Smith, saw no difference at all between it and osteo-arthritis. Whilst a third party, consisting of Dr. Dyce Duckworth, Dr. Buzzard, Mr. Barwell, Mr. Herbert Page, Mr. Macnamara, Dr. Broadbent, Mr. Clement Lucas, Dr. MacLagan, Dr. Charlton Bastian and Dr. Hadden, denied that there was any alliance between the two diseases, and Mr. Howard Marsh considered that we knew so little of the nature of osteo-arthritis that it was impossible to say whether they were or were not allied.

About the third question there was again a diversity of opinion, some of the members who were in favor of the view that the two diseases are allied holding that the occurrence of the disease in cases of locomotor ataxia was a mere coincidence. whilst others thought that ataxy predisposed to such changes from the fact of the joint being deprived of the protection normally afforded it by the surrounding muscles checking over-movement.

Sir James Paget thought that ataxy was the determining cause of the malady, though the form might depend on gout, rheumatism, or both and Prof. Humphry, Mr. Jonathan Hutchinson and others agreed with this view. The latter likened the action of ataxy to that of old age

in predisposing to arthropathy. Sir James, however, stated that he did not quite agree with Mr. Hutchinson, in regarding the part taken by the nervous system as merely passive.

The fourth question was not so fully discussed as the preceding ones; but Dr. Buzzard stated, that having investigated a great many cases of rheumatic arthritis, he had never found ataxic symptoms. Mr. Barwell thought there was much in favor of the origin of arthritis deformans from some nervous injury other than that in ataxy. Sir James Paget held similar views, whilst Dr. Broadbent also inclined to the view of the common origin of two diseases from a nerve lesion. Mr. Howard Marsh did not know whether osteo-arthritis itself was of nerve origin. Dr. Barlow did not consider chronic rheumatic arthritis a very definite entity.

The fifth theory of the possible origin of Charcot's disease, locomotor ataxy and chronic rheumatic arthritis from some common antecedent disease was disposed of (supposing that disease to be syphilis) by Dr. Pye Smith, who said that osteo-arthritis had been found in horses, in the bones of bears in the glacial period and in the bones of a porpoise.

We will conclude this short summary by stating the impression produced on us by weighing the arguments of the different speakers.

We think that the weight of evidence is to show that Charcot's disease is a distinct, well-defined malady not related in any way to osteo-arthritis, to which it has indeed a superficial resemblance, especially in dried preparations, although even here, in well marked examples, the thinning and erosion of the bones with their brittleness, and of the feeble, if any, attempts at repair of the former, contrast sufficiently strongly with the condensation and abundant outgrowths of the latter. But the clinical features are in still greater contrast. The rapid and painless effusion into and disorganization of the joint, and the frequency of recovery in ataxic arthropathy, are very widely different from the slow, painful and intractable course of osteo-arthritis. As to the causation of ataxic arthropathy, we believe that it probably depends, as suggested by Dr. Bastian, on the extension of the sclerosis from the posterior columns of the cord to the anterior and also to the nerves. We have seen sections of the cord and nerves from a case of perforating ulcer of the foot where the changes in the anterior and posterior nerve roots and in the nerves themselves were very marked.

PROCEEDINGS OF SOCIETIES.

THE LONDON CLINICAL SOCIETY.

SESSIONS FROM NOVEMBER 14 TO DECEMBER 23, 1884.

CHARCOT'S DISEASE.

Mr. Marrant Baker read a paper on three cases of ataxic arthropathy, in all of which both the ataxia and the characteristic joint changes were well marked. He suggested that a discussion should take place in connection with them on the following points:

1. Is the disease actually new? 2. What are its alliances, if any, with rheumatoid arthritis? 3. If allied to the last named disease, is its occurrence in conjunction with locomotor ataxia a mere coincidence? or do these stand in the relation, one to the other, of cause and effect? and 4, if connected pathologically, both with rheumatoid arthritis and with locomotor ataxy, should not all cases of rheumatoid arthritis be considered of neurotic origin, whether accompanied or not by symptoms of locomotor ataxy?

Another possible theory is, that if Charcot's disease, locomotor ataxy, and chronic rheumatic arthritis are all connected, they may have a common origin from some antecedent disease.

Mr. A. E. Barker related a case in which the only symptoms of locomotor ataxy were increased frequency of micturition, especially when the rectum was loaded, much nausea, vomiting with epigastric pain and a feeling of distension in the abdomen, numbness in the feet and attacks of "rheumatic" pain, and, later on, a perforating ulcer in the sole of the right foot. These gastric attacks recurred from time to time and the foot was much worse after the attacks.

The symptoms began in January, 1881, and in the present year shooting pains in the left thigh and quivering of the muscles were noticed, together with a feeling of sudden weakness from time to time. Soon one of the knee joints underwent complete disorganization with

dislocation of the tibia—still the patellar reflex remains perfect and there are no ocular or other additional symptoms of *tabes dorsalis*.

Dr. Dyce Duckworth did not believe the disease to belong to the class of ordinary rheumatic arthritis, but to be a definite joint affection, distinctly associated with disease of the nervous system. Clinically, the course of the two diseases above mentioned was very different.

In the course of a few weeks destruction had occurred in Charcot's disease such as was not seen in an ordinary case of rheumatic arthritis in twenty years. He considered Charcot too acute and experienced an observer to fall into error on this question. The joint change was not traumatic and was unlike an ordinary arthritic affection. As to pathological appearances, it was the most axiomatic creed in medicine, that identity of lesion was no proof of identity of the process which led to it.

Dr. Hale White contrasted the fact, that Dr. Moxon had not met with a single case of joint disease in thirty cases of locomotor ataxy, with Charcot's proportion of one in ten. He referred to a case he had seen where the temporo-maxillary joint was exactly like those of Charcot's disease, whilst other joints presented the characters of well marked rheumatoid arthritis. He thought the two maladies had much in common, and that Charcot's disease was probably a modification of rheumatic arthritis.

Dr. Buzzard thought the disease was probably not new. He had found a case in Graves' works which was clearly one of locomotor ataxy, as long ago as 1823, before Romberg or Duchenne's account of *tabes dorsalis*. He also pointed out how little record was kept of cases in earlier times, the enormous increase of population, and the fact that there were no out-patients to hospitals until fifty years ago or less, so that we should naturally meet with a greater proportion of cases than formerly. Charcot described his first case of joint affection alone in 1868, and five years later, one with several joints affected and spontaneous fracture of the long bones. That observer believed that the bones were first affected and that the joint disease was a part of the osseous alteration. Lionville compared a case of ataxic arthropathy with one of *tabes dorsalis* with spontaneous fractures of bones, and found, in each case, dilatation of the Haversian canals, with remarkable

thinning and erosion of the bones. Reynard found that the mineral constituents were reduced from 48 to 11 per cent. and the fat increased from 5 to 37 per cent. Dr. Buzzard suggested measuring the specific gravity of the bones of a diseased joint as a possible mode of differentiating between Charcot's disease and rheumatic arthritis. Joint diseases naturally went to surgeons. He had seen some hundreds of cases of *tabes dorsalis*, but could almost count on his fingers the number of diseased joints amongst them. Dr. Charcot had very different opportunities at the Salpêtrière, many of the patients being such as are found in our workhouse infirmaries, and remaining for years under observation. He thus explained Dr. Moxon's experience. Amongst his numerous cases of nervous disease in out-patients no wonder he (Dr. Buzzard) had met with several cases of associated joint disease, and yet, in each case, the nervous disease was *tabes dorsalis*. Again, cases of rheumatic arthritis, watched for years, had never shown symptoms of *tabes dorsalis*. He had investigated a great many cases of rheumatoid arthritis in English infirmaries and had never found ataxic symptoms. He considered that Charcot's disease contrasted, clinically, in the strongest manner with rheumatic arthritis.

Mr. Barwell thought we knew little of the real nature of acute, chronic and gonorrhœal rheumatism. There was much evidence in favor of the origin of arthritis deformans from some nervous injury other than that in locomotor ataxia. He considered both the anatomical and clinical appearances to be more diverse than at first sight appear. For example, in the elbow joint in the case of Charcot's disease the head and neck of the radius and also the proximal end of the ulna and the internal condyle of the humerus were almost entirely worn away—changes quite different from those in chronic rheumatic arthritis. He had never seen a joint with these appearances in arthritis deformans; as in the latter, marginal hyperplasia (absent in Charcot's disease), interstitial atrophy and porcellaneous deposits, together with numerous false bodies, are the marked features. He said that the fibrous degeneration of the articular cartilage was quite peculiar to arthritis sicca.

In Charcot's disease,* the painless onset and the rapid swelling of the whole limb, including the joint, contrasted with the gradual appearance of hydrarthrosis, when it occurred, in arthritis deformans. The mobil-

ity and distension of the joints in Charcot's disease were also characteristic; whilst the adduction of the hand was never met with.

Sir James Paget agreed closely with Mr. Marrant Baker upon nearly all his points. First, as to whether Charcot's disease was new; all that was possible would be to prove it was not old. When we remember that John Hunter, who studied cases of joint disease by the hundred in workhouses and infirmaries; George Langstaff, a poor-law medical officer; John Howship; Cruveilhier and Mr. Stanley collected every species of disease of bone for a period of eighty years; we cannot but believe that Charcot's disease must have been detected had it had a separate existence. And yet there did not exist in any museum, until recent times, a single specimen of the disease. This proved that the disease was not then nearly so common as now.

Charcot's disease, then, if not actually a new malady, is a new compound of diseases.

That the arthritic affection was the result of a neurosis alone he did not believe. He would not say that the disease was either this or that, but he thought that it was some of these or some of those, a disease made up of several constituents, and of an altogether obscure and uncertain nature. He thought that its name, taken from an individual, just as *morbus anglicus* (rickets), *morbus gallicus* (syphilis), Pott's disease and Bright's disease, were names derived from more or less accidental circumstances, showed that it was but imperfectly known.

He thought that possibly Charcot's disease was rheumatic arthritis modified by locomotor ataxia. In the tabetic arthropathies we had wasting without repair; in rheumatic arthritis, wasting with coincident attempts at repair.

Between typical cases of each the differences appear startling enough, yet if the whole range of joint affections in the two were compared, it would be seen that as they ran border to border they became confused on each side. By the possible intervention of three such diseases as rheumatism, gout and nervous disorder, a very wide range of characteristics might be explained. In illustration he spoke of the results of syphilis implanted on an arthritic or rheumatic stock, as compared with its results when implanted on a tubercular soil.

Dr. Ord had never had a case of this joint affection under his care;

but, from the little he had seen of it, he thought there was a general agreement between rheumatic arthritis and Charcot's disease. He agreed almost entirely with Sir James Paget. Whilst laying stress on the waste of bone he yet thought there were attempts at repair in Charcot's disease. He had also seen something like eburnation at the ends of the bone.

Professor Humphry agreed entirely with Sir James Paget. He compared the wasting of bone in tabetic arthropathy with that of the neck of the femur in intra-capsular fracture.

Mr. Jonathan Hutchison had at first been inclined to regard Charcot's disease as *sui generis*. He now doubted active nervous influence either in it or in chronic rheumatic arthritis. He had compared the changes in old age with those in tabetic arthropathy. He likened tabetic arthropathy to a kind of tumultuous old age. A state of anæsthesia was common to senility and locomotor ataxia; in the bladder it led to urinary troubles. The result of treatment proved that perforating ulcer of the foot was caused by external irritation, acting in conjunction with loss of sensation. The action of the nervous system was permissive, not exciting in Charcot's disease.

Sir Andrew Clark asked Sir James Paget to explain more fully his views on the relation of the nervous disease to the tabetic arthropathy.

Sir James Paget would not say that the joint changes depended only on the nervous system; but did not consider the nervous influence simply passive. It was difficult to state the determined factor of the disease, though he believed the nervous system could cause disease in any part. In herpes zoster he believed that nervous disturbance was the exciting cause, but the form of the eruption probably depended on other causes. The affection was not solely determined by error of nervous force, but the method and manner of the external appearances of the disease were dependent on many other causes, such as gout, rheumatism, syphilis; and as individuals were prone to a disease in this or that method whilst the determining cause lay in the nervous system.

Mr. Whitaker Hulke denied that Charcot's disease was a separate malady. There was no essential anatomical difference between it and *malum senile*. As to the clinical course, he saw the case of a French dancer, with well marked *tabes dorsalis*, who had enlargements of joints

of both lower limbs. One day one knee joint became suddenly swollen, with excruciating pains and all the signs of acute synovitis. This proved that the joint changes were not always perfectly sluggish in their clinical manifestations. Syphilis might play a part in the causation of the disease.

Dr. Duckworth read a *précis* of two letters from Professor Charcot. Charcot had not met with the joint disease apart from *tabes dorsalis*. He allowed that rheumatic arthritis may occur in a case of *tabes dorsalis*, but that was another matter. He referred to the porosity and fragility of the bones.

Dr. Duckworth repeated his former opinion on the subject. Dr. Moxon, in proposing a vote of thanks to Charcot, professed much admiration for him, but seemed to consider him too imaginative. He then made a long and witty speech in which he expressed dissatisfaction at the indefinite nature of the discussion, and particularly of the views expressed by Sir James Paget. He agreed with Mr. Hulke and saw nothing remarkable in the disease.

Westphal had shown that in one-third of those suffering from general paralysis of the insane, locomotor ataxia was present; yet there was not a case of ataxic arthropathy amongst the general paralytics either at St. Luke's or Bethlehem. He suggested that the freedom from joint disease in these cases might be due to the paralysis. He quoted the case of an ex-cabman, the head of whose humerus had been worn away by jolting. He considered this half-way to Charcot's disease, and thought that a Charcot's joint might be produced in the same way by the muscles failing to protect the joint by checking its movements owing to ataxia. He ridiculed trophic nerves, and said that no one had shown the nerves going to diseased joints to be diseased. (Sir Andrew Clark here referred him to some observations by Charcot's pupils.) He did not admit the influence of trophic nerves in causing unilateral bedsores in hemiplegia, but referred the sores to the tendency of the body to roll upon the paralyzed side by the continuous action of the still healthy limbs. Paralyzed muscles were unable to hold open the vessels supplying them and passing through them to the joint above, hence their wasting and the sloughing of the skin over them.

Mr. Henry Morris narrated two cases: one of a man admitted into the Middlesex Hospital for disease of the knee, in 1877. The joint had the appearance of aggravated chronic rheumatic arthritis, but it had all the special characters of Charcot's disease. There was also a rodent ulcer of the face. Six years before he had been working in water and suffered from rheumatic pain for a year before the joint swelled, at the end of six years the leg being like a flail upon the thigh.

The internal ligament of the knee was ossified. Eight weeks before death there was difficulty in speaking, and blood was vomited a few days before death. There were no ataxic symptoms.

In the second there was elephantiasis of one limb and volvulus of long standing which caused death. In this case the ankle had lost all its normal characters; he walked on the inner border of the foot, and there were perforating ulcers on the great toes. The right foot had become diseased twenty-one years before; suppuration had occurred and bone come away. Fifteen years before the left ankle became affected, and the elephantoid condition of the skin had lasted ten years. The disease was painless, of long duration, and attended with profuse perspiration. There was no ataxia. At the autopsy, there was a saucer-like cavity about the ankle, with thickening of the bone about the tibia and fibula, which were firmly united. Sections of the posterior tibial nerves of both sides, which were swollen, showed enormous thickening of the epineurium, little of the perineurium, and some thickening of the endoneurium.

Mr. Herbert Page gave the case of a man with seven gastric crises, lightning pains and disorganization of the tarsal bones of one foot first, and shortly after the other. Ankylosis was obtained by plaster of Paris. There was little or no ataxia. This was in 1883. In 1884 there was a recurrence in one foot, the ankle and tarsal bones being involved. If this were an exacerbation of rheumatism it was strange that it should not have attacked the other foot. The wearing away of the bone was rapid, and not like a rheumatoid change where friction might play a part. Why should we not admit that irritative nerve lesions produce changes quite unlike those from mere removal of nerve influence, as after section of a nerve. He believed Charcot's disease was a distinct affection of joints.

In reply to Dr. Moxon: There was no ataxia of gait, and the recurrence of joint disease affected only one foot. Dr. Moxon then inquired if rheumatism were less capable of acting on one side than locomotor ataxy; was not ataxy always of both sides?

Dr. Pye Smith said there was no evidence that any disease was new. Cholera and diphtheria were not new, and cerebro-spinal insular sclerosis had only recently been discovered. There was not enough evidence to separate Charcot's disease and osteo-arthritis. In osteo-arthritis production preponderates, and wasting in Charcot's disease, yet in a number of cases some attempts at production would be found. Acute rheumatism was an entirely different disease, and yet, occasionally, cases of acute rheumatism exhibited changes in the phalanges like those of osteo-arthritis. There was now overwhelming evidence of the existence of trophic nerves; yet nerve lesions could hardly have anything to do with Charcot's disease, seeing that the anterior roots were not involved in *tabes dorsalis*. He considered that *tabes* was not an absolutely fixed and definite entity. He referred to the discovery of osteo-arthritis in bones belonging to bears of the glacial period, and also in the bones of a porpoise as proving that syphilis could have nothing to do with osteo-arthritis. He concluded by saying that investigation was better than speculative imagination.

Sir Andrew Clark said that Charcot's views had been misunderstood, and gave a brief summary of them as follows: Arthropathies may occur independently of any specific influence, from any special nervous disease. Further, an ordinary osteo-arthritis may occur in the course of *tabes dorsalis*. There were many injuries and diseases, acute and chronic, of the nerves, spinal cord and brain, which produce arthropathies of various kinds, and amongst them was one which, from its pathological appearances and the assemblage and progression of its clinical symptoms, deserves, and indeed demands, a specific name, and this was Charcot's disease itself.

Mr. Macnamara said, Charcot's disease was not very uncommon, as Mr. Lunn had, in one London Hospital, in a short time, collected five typical cases of it. Some diseases of joints undoubtedly depend on nerve influences; osteophytes were found in all chronic non-suppurative disease of bone. Dr. Buzzard had said, more than eleven years ago, that

chronic osteo-arthritis might also occur in *tabes dorsalis*. Dry bones were very unreliable guides as to the pathology of joint disease.

Clinically, the difference between Charcot's disease and rheumatic arthritis was still more marked, and detailed reference to Mr. Baker's case showed the difference extremely well.

The morbid process in Charcot's disease was that of a rapidly advancing rarefying osteitis.

In reply to Sir Andrew Clark: Chronic rheumatic arthritis was almost always painful, and condensation of the bone was the chief process.

Dr. Broadbent thought it was impossible to identify Charcot's disease with chronic rheumatic arthritis. In the history of disease vital processes are of far greater importance than morbid anatomy. There were at least two distinct diseases comprehended under the term chronic rheumatic arthritis, *i. e.*, that in young females and *morbus coxæ senilis*. Then there was the tabetic arthropathy, and very similar results may be due to neglected chronic synovitis.

He considered that the view which endeavored to establish a relation by like causation between chronic rheumatic arthritis and Charcot's disease a very hopeful one. A derangement of nutrition in the joints may be brought about by disorder of the nervous system, which might be excited reflexly in chronic rheumatic arthritis and directly in Charcot's disease, as the result of a persistent irritative lesion of the spinal cord. This was very much Dr. Ord's position, and he inclined to believe in it. He thought *herpes zoster* a fair illustration. He disagreed with Mr. Hutchinson as to the passive part played by the nervous system.

Mr. Clement Lucas differed *in toto* from the speech of Sir James Paget and those who followed him. Chronic joint diseases must present certain similarities. The question of a new disease had a double answer given to it by Sir James Paget. In a general sense the disease might be regarded as a new one, but in a special sense it was a combination of other diseases. The latter view he thought a combination of errors. Curators collected typical specimens, and so possibly all specimens of Charcot's disease may have been discarded as not typical. The commencement and progress of Charcot's disease was totally unlike gout or rheumatism.

Dr. Maclagan considered Charcot's disease to be totally distinct from gout, rheumatism or chronic osteo-arthritis. In its pathogenesis we could not divorce it from tabes dorsalis. The tendency of the disease to affect the legs more than the arms arose from most people using their legs most. He believed with Dr. Pye Smith that a new disease was impossible.

Dr. Charlton Bastian thought that the exceptional occurrence of Charcot's disease in locomotor ataxia might be due to the fact that, as a rule, only the posterior columns were affected, and that the joint affections depended on the involvement of the grey matter of the anterior horns.

It had been shown in the past two years that the ordinary symptoms of locomotor ataxia might exist where no central, but only peripheral, lesions could be detected. The notion that ataxic arthropathy was a new disease was diametrically opposed to the conclusions of Charcot, and to his own views; it had not been recognized before, but doubtless similar influences had been at work in every period of civilization.

Mr. Howard Marsh, referring to Sir James Paget's views, said, that as Stanley worked at diseases of bone until 1850, by Sir James' argument the disease could only have been prevalent for thirty or forty years. Paget's own work, however, extended at least to 1865, and as he was as unlikely as Stanley to have overlooked it, we were brought down to twenty years, a conclusion more difficult to accept than that Hunter had overlooked it.

He quoted a case which he had seen recently of disease of the hip joint, which began two years ago, as a well marked osteo-arthritis, but which had very gradually acquired the characters of a typical Charcot's joint; yet there were no symptoms of nerve disease.

We did not yet know whether osteo-arthritis itself were of nervous origin, or a common name for several, distinct but as yet undistinguished affections; so were not in a position to say how, if at all, Charcot's disease was related to it.

Dr. Barlow did not consider chronic rheumatic arthritis itself a very definite entity; but merely an anatomical term for a condition brought about by a great many processes.

Dr. Bernard O'Connor contrasted the changes in arthritis sicca with those in Charcot's disease. The influence of nervous lesions in the causation of arthritic changes was also discussed.

Dr. Hadden believed Charcot's disease to be a distinct and separate malady. He doubted its being new. A description was read from Stanley's work which seemed to be a fairly typical one of Charcot's disease. He thought it probable that an anterior polio-myelitis was the cause of the joint disease.

Mr. Marrant Baker closed the discussion. He said chronic osteo-arthritis was neither rheumatism nor gout. Charcot's disease was fairly definite and with the same pathological changes as osteo-arthritis. He thought the disease was probably chronic osteo-arthritis occurring in tabes dorsalis. He had found Charcot's disease in all the cases of tabes that he had had. He did not consider the disease new. He thought it had been overlooked.

PHILADELPHIA ACADEMY OF SURGERY.

STATED MEETING, DECEMBER 1, 1884.

COMBINED TUBULAR AND CAPILLARY DRAINAGE OF LARGE WOUNDS.

Dr. W. W. Keen brought to the attention of the Academy a method which he had used, which united the advantages and avoided the dangers incident to the use of tubes, or of capillary drains, in the treatment of wounds. The chief advantage of the tubing is its free discharge. Its disadvantage, in addition to that noted above is, that, if used for any length of time, when removed, it leaves a tubular passage of considerable calibre lined with granulations. This passage, if long, as in large wounds, is often apt to close at two or more points in its course, thus penning up the slight discharge and producing retention and suppuration. The disadvantage of the capillary drainage is that it is not fitted to give exit to large amounts of fluid. Its advantage is that it leaves no such tubular passage; but that, while giving us the means of introducing tubing for freer drainage, if at any time it is needed, it allows nearly complete healing, even while a few of its strands are still *in situ*. Especially is this of value in larger wounds with long drainage-paths.

The method referred to is as follows: When the wound is ready to be closed, a fenestrated rubber drainage-tube and a bundle of horse-

hair of fifteen to thirty or more strands are both placed side by side in the wound. At the end of twenty-four or forty-eight hours, the abundant oozing of bloody serum usually necessitates a redressing, but by this time the first abundant discharge had ceased. Accordingly, at the first dressing after the operation, I remove the rubber tube, leaving the horsehair in place. If the oozing will probably be small, I often even remove a large part of the horsehair. At the second dressing, say in three to six days, I remove all the horsehair, or all but two or three strands. In doing so, I always remove the hairs one or two at a time, as the nice adjustment of the surfaces is thus scarcely at all disturbed. At the third dressing, if all has gone well, the last horsehairs are removed, and the capillary passage heals within twenty-four hours.

For joints, or in other wounds where possible longer slight discharge may take place, the horsehair may be left for longer periods, as judgment dictates.

I have used this method in amputation of the breast, often bringing tubing and horsehair out through a button-hole counter-opening in the axilla, and treating it as described above. I have used it in a large number of amputations of the upper and lower extremities, and in the removal of tumors of the neck and other parts of the body, and find it to work admirably.

The same result may be attained by first using the tubing alone, and replacing it at the first redressing by the horsehair, but the pain and the mechanical disturbance of the wound are so much greater than the method above described that I have never found it to answer as well.

Of course, for small wounds only the horsehair is required.

While speaking especially of rubber tubing and horsehair, this method of combined drainage will answer equally well with any of the other materials mentioned, and it is to the method that I particularly design to call attention rather than to the material used.

Dr. S. W. Gross thought that Dr. Keen's remarks in regard to the use of horsehair are capable of a wide range of application. He had used decalcified bone, and he had been more disappointed with it than with anything else that he had tried in surgery. They absorb the fluids, become soft, and collapse. If soaked in alcohol they become stiff, and are to a certain extent rendered unabsorbable.. Some time

ago he removed from a man's axilla a number of caseous tubercular glands, and put in a decalcified bone drainage-tube, attaching it to the edges of the incision with catgut ligatures. Seven days later, when the dressing was removed, it was found that healing had taken place, and that the catgut ligature and the tube had disappeared. Four months later, the man returned with an opening in the axilla, which was supposed by some to be due to some of the glands having been overlooked. He passed a pair of forceps into the opening, and drew out the bone drainage-tube, which had not undergone the slightest change. Looking up the literature of the subject, he found a case described in which, for the cure of hydrocele, the sac was incised antiseptically, and a decalcified bone-tube introduced. Fifteen months later the tube was removed unchanged. It follows from this experience that no reliance can be placed on these tubes. He uses exclusively the red rubber drainage-tube, which he considers better than the black.

He thought that horsehairs can be utilized to such an extent as to enable us to do away almost entirely with the use of rubber tubes. In large wounds hereafter, he should introduce a drainage-tube and a loop of horsehair, and at the first dressing remove the large tube, allowing the hair to remain. The same thing can be done in the stump after amputation. A number of hairs may be put transversely, and a few be put between the stitches. When the rubber tube is used, he saw no necessity for leaving it after the first serous discharge has ceased; for where a case is being treated aseptically, pus, even if it should form, will be aseptic pus.

NEW YORK SURGICAL SOCIETY.

STATED MEETING, NOVEMBER 25, 1884.

EXCISION OF THE ENTIRE TARSUS FOR TUBERCULAR OSTEITIS.

Dr. W. T. Bull presented a patient upon whom he operated more than six months ago for tubercular osteitis of the bones of the tarsus, and removed the entire tarsus with the exception of compact lamina forming the posterior rim of the os calcis. The result had not been very satisfactory. The patient was an Italian, twenty-one years of age,

without constitutional vice. The wound healed satisfactorily, so far as general symptoms were concerned, under peat and iodoform dressings, and the application of plaster-of-Paris splints. At the end of four months, however, the discharge continuing, Dr. Bull scraped out the sinuses, and in about one month after this operation they were all healed. Since then they have broken out once or twice, but are now healed. He could bear weight on the foot at the end of three months, but with pain. At present the limb is one inch shorter than the other, the calf of the leg smaller by two inches, and the circumference of the instep less by three-fourths of an inch, and the heel broader by one inch than the opposite heel. The foot is in good position, and there is considerable flexion and extension of the metatarsus.

The patient walks, with a slight limp, upon a thick-soled shoe. He is working in a grocery store, but has pain enough at times to interfere with his work. It should be remembered that there was left behind a thin shell of the os calcis, through which one drainage tube passed, and the continuance of the pain might be explained by inflammation in this bone. It was possible that the functions of the foot might improve, as the man had had a proper shoe but a few days. Judging from the present condition, he should be compelled to think that amputation at the ankle-joint would have been a more rapid means of cure, since that would have given, with a good artificial foot, facility in walking. But the man was hardly in a position to provide himself with that luxury. Dr. Conner, of Cincinnati, reported last year to the American Surgical Association two very favorable results after complete excisions, and Dr. Bull had been stimulated by a perusal of his very thorough paper on the subject to try conservatism in preference to amputation.

Dr. Bull referred to another case, that of a married woman, twenty-five years of age, who had about the same condition of the tarsus, but there was, besides, evidence of disease of the tibia and fibula. He removed not only the bones of the tarsus, but sawed off the lower ends of the tibia and fibula. Yet the patient was never able to walk at all except by the aid of artificial support, and the limb was finally amputated.

He thought that the testimony afforded by these two cases was certainly not very satisfactory with regard to extensive resection of the bones of the tarsus.

INDEX OF SURGICAL PROGRESS.

General Surgery.

I. L'INFLUENCE DU TRAUMATISME SUR LES DIATHÈSES. Par DR. E. SCHWARTZ.

The author calls attention to the influence of traumatism on the growth of cancer, and reports two cases in which the operation for the removal of malignant tumors was followed immediately by great acceleration of the growth of secondary deposits.

A lady, aged 46, submitted to removal of the breast with the implicated axillary glands for a rapidly growing cancer of the mamma. Previous to the operation her health was satisfactory, and there was no evidence of generalization of the disease; but from the third day after it unequivocal signs of secondary deposits in the liver appeared, and the disease progressed with such rapidity as to kill the patient in nineteen days.

A man, aged 48, had a tumor of the testicle of two years duration, and an evidence of enlargement of the lumbar gland existed. Castration was performed, and the patient progressed favorably until the fourteenth day, when he complained of lumbar pain; an examination, three days after that, revealed enlargement of the lumbar glands. Fifteen days later the tumor was found to have increased enormously, having invaded the lumbar fossa and right iliac region. The patient left for the country, and was not heard of again.—*Revue de Chirurgie*. 1884. October.

II. DE LA TUBERCULOSE AU POINT DE VUE CHIRURGICAL. A discussion, by the aid of clinical facts, of the mode of entry of the bacillus tuberculosis into the human body.

It may enter by the external integuments:

1. By direct inoculation, either by an anatomical puncture or by destruction of the protecting epithelium.
2. By superficial lesions due to affections of the skin, or of the natural glandular orifices of the external integuments.

Two examples of dorsal inoculation other than experimental are cited. A medical student pricked himself in making an autopsy in a case of phthisis; a tubercle developed at the seat of puncture and was rapidly followed by extensive pulmonary lesions. In the other case a papule, which suppurated and remained fistulous, followed a post-mortem puncture; it became the starting point of several secondary foci.

Examples of the second mode of entry are found in the cases in which pulmonary phthisis follows lupus and some forms of impetigo in which the tubercle-bacillus has been found.

Inoculation may take place by inhalation or ingestion, the latter being especially frequent in children from their source of nourishment. The pharynx and buccal cavity can also be the seat of primitive tuberculosis; the former by its numerous glands, and the latter by reason of its liability to erosion, scratches, and excoriations, rendering the mode of inoculation easily conceivable.

The tubercle bacillus may circulate in the blood and lymph streams of an individual possessing all the appearances of health, until an inflammation or injury causes their secondary localization or generalization. In inflammation the bacilli are carried with the emigrating leucocytes into the connective tissue of the inflamed region, which offers favorable conditions for their development; and in the injury the diffusion of the organism is brought about by the rupture of small blood and lymphatic vessels. The growth of the organism may also take place by direct extension after wounds, as in the opening of tuberculous abscesses, or by extension over granulating surfaces.

The following propositions, formulated by M. Verneuil, express the laws which regulate the inoculation and generalization of tuberculous infection:

1. A primitive general infection by invasion of the organism (come from without) and penetrating direct by the blood or indirectly by the lymph channels.
2. Secondary general infection by penetration into the circulation of microbes from a tuberculous centre which had existed a longer or shorter time, and, until then, had remained isolated and independent.
3. Primitive localization by fixation of the microbe (come from without) in some part of the economy situated more or less deeply, but outside the vascular network.
4. By secondary localization, implying an anterior general infection, which furnishes by different mechanisms (as by interstitial auto-inoculation, diapedesis, etc.), microbes capable of forming fertile colonies in certain points of the organism.—*Gaz. des Hôpitaux*. 1884. Nov. 8. F. S. ENO.

III. THE USE OF HOT WATER IN SURGERY. Par DR. RECLUS.—Used by Dr. Gmelin, in 1742, for keratitis. For chronic uterine hyperæmias. It has also been recommended to prepare, by irrigation of hot water, a hyperæmic uterus which is about to be submitted to an operation likely to involve great loss of blood. These irrigations are repeated for several days before the operation. Dr. Gordon has cured gonorrhœa (taken at its commencement) in four to five days by urethral injections of hot water, repeated three or four times a day. The injection should reach the bladder. M. Landowski checked obstinate bleeding from internal and external piles by a hot sitz bath raised from 35 to 45°C. and continued fifteen minutes, and the piles subsequently dried up. Acute prostatitis was cured in three

days by perineal compresses wrung out of water at 55° C., and by fomenting with the same. It is also valuable for congestion of a hypertrophied prostate. It will check a commencing whitlow, and when suppuration is inevitable will limit it and hasten convalescence. It proved of great service for a large deeply sloughing carbuncle, cleaning off the sloughs and establishing vigorous granulation. Combined with the use of a Martin's bandage it will cure very large ulcers of the leg, even without rest in the horizontal position. It relieved the pain of a painful subcutaneous tumor on the front of the tibia of a man who declined operation.—*Gaz. Hebdomadaire*. 1884. 5 Dec.

IV. THERAPEUTIC USE OF SALTS OF COPPER. Par DR. DU MOULIN. Chronic cuprism is not admitted as a result of the prolonged administration of copper in medicinal doses. In large doses its emetic action prevents a fatal result; it has even been said that on this account small, *i. e.*, non-emetic, doses are more harmful than larger ones. Dr. Du Moulin has observed toleration of large doses without vomiting (80 centigrams in four days) by a child three years old. In conducting experiments with the acetate of copper on a puppy which happened to be suffering from eczema, he was surprised to find that in the course of a month the eczema was entirely cured, and was thus led to its employment in this disease. In the first case, that of a child three years old, who had resisted all other treatment, the first effect was nausea and vomiting, and this continued five days. In two and a half months the boy was well. The dose recommended was from 2 to 12 centigrams of the sulphate daily, according to age. A local application of the same salt, dissolved in glycerine, seemed to hasten the separations of crusts. He employed it successfully for inflamed glands, whether acute or chronic, and with variable results for strumous ophthalmia. Where the cornea is ulcerated it is useless. The author points out the occurrence of copper in the blood, and especially in the hair and nails of healthy persons. In certain molluscs copper seems to take the place of iron in the higher animals. It is found in excess in the hair and nails of those who work in copper. This may perhaps assist us in understanding its action in eczema.—*La France Medicale*. 1884. 7 Dec.

V. ROSINOL AND ITS THERAPEUTIC USES. Resin is the residue obtained by distillation of turpentine; it consists of abietic acid, with a small proportion of acetic and succinic acids, and tarry hydrocarbons. Dry distillation of resin produces, among other bodies, an oil termed Rosinol (C_{35}, H_{16}), in appearance like oil of sweet almonds; yellow, mobile, of neutral reaction, and containing a number of well-known substances, such as cresylic acid, creosote, etc. As a topical application in vaginitis and metritis, it exerts quite a specific action, and, mixed with vaseline, has been employed with much success for burns, piles, and different skin diseases. Given internally, in teaspoonful doses, in typhoid fever, it has appeared to promote cicatrization of the intestinal ulcers and give tone to the intestines themselves. Similar action in cases of gastric ulcer is described as astounding. It exerts an "anti-catarrhal" effect on all mucous membranes.—*Le Progres Medical*. 1884. 6 Dec.

A. F. STREET.

VI. SYPHILITIC AFFECTIONS OF CEREBRAL NERVES, WITH OBSERVATIONS. By MR. HENRY LEE. Mr. Lee details two extremely interesting cases of the above. In the first there was paralysis of the whole of both facial and auditory nerves. He describes the symptoms produced thereby, and makes some observations on the physiology of the same. In the second case, "for many months the power of adjusting the focus of the left eye was impaired." He attributes this to prolonged irritation of the 4th nerve and of its corresponding muscle, producing "the comparatively and permanent short-sighted condition" of the eye affected. In some extremely interesting observations he shows that mechanical pressure on the globe will alter its antero-posterior diameter, and that the oblique muscles of the eye (in addition to the function usually attributed to them) are able to compress the eye laterally and to slightly alter its antero-posterior diameter, and that thus these muscles, external to the globe, are enabled to aid in adapting the eye to vision at different distances.—*Lancet*. 1884. 1 Nov. HUBERT F. WEISS.

VII. CACHEXIA STRUMIPRIVA. By DR. R. GRUNDLER. Total extirpation of goitre is not considered more immediately dangerous than partial. The after effects of this comparatively new operation are now becoming known. Kocher removed over one hundred goitres in a few years. A couple of years since, he and other Swiss surgeons published cases showing that severe constitutional effects may follow loss of the thyroid [see Jan. No. of this journal]. This led Bruns to send for the patients he had thus operated. Only three appeared for examination. Of these, one, a woman of twenty-six years, operated six months previously, was perfectly well; the other two were not.

CASE 1. Woman, of twenty-two years. Goitre begun in childhood. She seems even then to have been somewhat peculiar and retiring, perhaps from being laughed at. The growth had doubled in the last four years. One side was tapped, and 44 cc. fluid removed, but it refilled in a couple of weeks. Excision of one-half, in June, 1880. Good recovery. Within five months the other half doubled in size; it was removed eight months after the first. Soon after returning home, she found it was impossible to work as formerly. Even light labor caused pain in the back and extremities. When she was not lying down the feet would swell. This last year she has lost most of the hair from the head. Hearing and vision have become poorer. Mental faculties diminished. Unsociable. Menstruation, however, which was scant and irregular before the operation, has since been normal. Facial expression idiotic. Skin and mucous membranes very anæmic. Hands cyanotic. Red and white corpuscles reduced to nearly two-fifths their usual number (in a given quantity of blood). Hæmoglobin also materially reduced. Position and consistency of trachea normal. She answers questions with extreme slowness, and takes no interest in her surroundings. G. represents this to be the worst case observed.

CASE 2. Man, of twenty-four years; operated six months previously; presented well-marked initial symptoms of the cachexia. He experienced great diffi-

culty in heavy work—power soon gives out. Face puffy. Facial expression decidedly stupid and idiotic. Slow, difficult speech. No œdema, though lower eyelids and lips swollen. Vision, pulse, temperature, respiration, and blood, normal. Mind seems clear as ever.

A further case is given, where Sick (Stuttgart), in 1866, operated on a boy of ten years. This account is especially valuable, as showing the later effect of the operation when performed in childhood, and including the first post-mortem examination. Within six months after the total removal of the goitre, a notable change in his mental condition was observed. Mental capacity, now that of a boy of six or seven years; he could hardly be said to think at all. Dwarf, 127 cm. tall. Head cretinoid. Died in epileptic convulsions. Abundant development of panniculus adiposus and soft parts in general. Chronic leptomenigitis, with moderate participation of cortex. Grundler has collected thirty-three published cases—twelve males and twenty-one females. Some observers think the condition is not progressive; while Grundler, in concurrence with Kocher, holds that it is. The worst cases have a great similarity to congenital cretinism. He finds all the proposed explanations faulty, and locates the trouble in the central nervous system. Its cause must be the loss of the thyroid and its participation in tissue metamorphosis. Only partial removal is, therefore, admissible, except in the less frequent cases where partial excision is impossible.—*Mittheil aus d. chir. Klin. zu Tübingen*. 1884. Bd. I, Hft. III.

W. BROWNING.

Head and Neck.

I. SCALP WOUND, FOLLOWED BY BRAIN SYMPTOMS; TREPHINED; DEATH. Reported by MR. HILBERZ. Boy; four years of age; admitted to Guy's Hospital, under the care of Mr. Bryant, with a neglected scalp wound. The injury had been received five days before, and the child had been sick and drowsy; fever and drowsiness continued. The wound became puffy, gaped, and a good deal of bare bone was exposed over the right eye. There was a certain amount of swelling and discharge. The temperature ranged from 101° to 103° . On the thirteenth day there occurred a convulsive fit, which lasted an hour, followed by spasmodic contractions on the left side (the side opposite the injury), and that side became completely paralyzed. A piece of bone was removed by trephining from the centre of the wound. The patient, for a time, was sensible, and better, and recovered the use of the paralyzed limbs; but the evening temperature remained always high, and after a few days of fever, fits of a convulsive character, with unconsciousness and dyspnoea, set in until death. The examination after death revealed purulent infiltration of the skull all round the trephine wound. The greater part of the pia mater, on both hemispheres, was coated with a continuous layer of greenish-yellow lymph. There was a good deal of vascular granulation on both surfaces of the dura mater near the trephined region. The brain itself was not damaged. It seemed probable that the injury to the bone was the primary trouble. That this

led to suppuration, extending to the membranes, and thus to the fatal result. The other organs were all healthy, except some broncho-pneumonia on the left side.—*Lancet*, 1884. 8 Nov.

II. FRACTURE OF SKULL—RUPTURE OF BRANCH OF MIDDLE MENINGEAL ARTERY—TREPHING—DEATH. By MR. GODLEE. Boy; ten years old; walked home after a fall on the pavement; gave a clear account of the accident, and complained of pain in the back of his head; he then vomited, wandered in his talk, and became drowsy. Some six hours after, he was brought to University College Hospital, the drowsiness increasing, though he was able to stand up, and answer questions. There was no wound, but a large hæmatoma above the right ear. The movement of the left arm and leg were weak. Soon after admission his pupils became unequal, the right being larger. He took notice when spoken to, but struggled when the tender area was touched. After this he became rapidly insensible, with convulsive movements in the limbs—more especially the right side. The respirations were catchy and short; he yawned at intervals and grew gradually weaker. Trephining was performed over the right middle meningeal artery, and a large clot was discovered near the wound. Chloroform seemed to alter the already failing respiration so much for the worse that the operation was completed without an anæsthetic. Artificial respiration also was required; the pulse gradually grew weaker, and the boy died.

At the autopsy, a fracture of the skull was found on the right side, extending horizontally forwards from the junction of the lower and middle fourths of the lambdoid suture to one inch behind the temporal suture; beneath was a large disc-shaped clot, depressing the brain. The posterior branch of the middle meningeal was torn through at the point where fracture crossed it. Water injected through the carotid in the neck demonstrated the exact opening in the meningeal vessel, which was apparently plugged by a small clot. There was considerable flattening of the convolutions beneath the clot, and also of the convolutions of the entire brain. There was ecchymosis in the pia mater over the left frontal lobe; both the gray and white substances were disorganized in a small area above the frontal lobe.

The points of interest to note in the diagnosis were:

1. An interval of consciousness after the head injury.
2. The gradual onset of drowsiness, with vomiting.
3. The drowsiness passing into unconsciousness.
4. The paresis of one side of the body.
5. Slow pulse.
6. Slow respirations.

It seemed probable that the convulsions were more marked on the right side because of the paralysis of the left.

The seat of the rupture in the vessel was demonstrated, after death, to be situated vertically above the mastoid process, and $1\frac{1}{2}$ inches behind the centre of the

trephine hole, but there was nothing to point out more exactly the position of the lesion. Mr. Godlee concluded that the operations should be performed in these cases without the aid of an anæsthetic.—*Med. Times.* 1884. 1 Nov.

G. WHERRY.

III. AFFECTIONS OF HEARING IN TRAUMATIC FACIAL PARALYSIS. By DR. VERON. The author has reported two cases to the Société de Chirurgie in which blows had been received (one from a stick on the ear, and the other in a fall from a horse) on the right side of the head. There was unconsciousness, lasting between a half to one hour in each case, and that was succeeded by pains in the head, but not specially on pressure, buzzings, otorrhœa, inability to hear the ticking of a watch, and no transmission of sound through the cranial bone on the affected side. In one case the tympanum was ruptured. At the end of four or five days facial paralysis developed itself on the same side. This, after remaining very marked for two or three days, gradually disappeared under the treatment of leechings, blisters, faradization, and the hearing is said to have been quite restored in the one with the ruptured tympanum, while in the other a watch could be heard ticking at twelve centimeters distance. In neither were the movements of the tongue or soft palate interfered with, while phonation, deglutition, salivation and taste remained normal. Dr. Véron was of opinion that, from the preservation of electric sensitiveness, paralysis of orbicularis, palpebrarum, limitation of phenomena, the lesion was localized to that part of the aqueductus Fallopii beyond the branching off of chorda tympani. That the lesion was not a fracture, because of absence of pains on pressure, absence of arachnoid fluid, and rapid re-establishment of auditory functions, but an effusion of blood into the aqueductus Fallopii, followed by compression and inflammation of nerve. That the auditory troubles were due to effusion of blood into tympanic cavity. M. Chauvel considered Dr. Véron had gone too far for his explanations, since indirect fractures were not necessarily accompanied with great pain on pressure, or flow of fluid or persistent nerve lesion. That there was no proof of inflammation of facial nerve in the absence of clonic and tonic spasms. He could not understand effusion into aqueductus Fallopii, middle and internal ears, and rupture of tympanum with fracture of bone.

IV. CHRONIC HYPERTROPHIC RHINITIS. MR. SPENCER WATSON. An unusual case of this has been brought before the Medical Society by Mr. Spencer Watson. The girl, aged 21, had been suffering from a nasal discharge, occasionally offensive, for some eighteen months before being first seen. There was obstruction of both nostrils, due to excessive hypertrophy of the turbinated bones and their overlying mucous membranes. Portions of these were removed by operation, and the channels dilated with ivory plugs. Different sprays were used, and a course of arsenic given internally. The senses of smell and taste were restored, and respiration through the nostrils established most satisfactorily.

EPITHELIOMA OF THE TONGUE AND FLOOR OF MOUTH. By MR. MORRANT BAKER. Three cases of extensive epithelial growths operated, in one (aged 32), the right half of the tongue was removed; in another (aged 53) the tongue, part of the soft palate and right tonsil. In both these the cheek was transfixed and the incision brought forward an inch and a half to the angle of the mouth, and afterwards sewed up with hairlip pins: the diseased portions were removed with *écraseur* and scissors. In the third case (aged 50), the growth occupied the whole of the under surface of the tongue and floor of the mouth. This necessitated removal of the whole of the tongue, floor of the mouth, submaxillary glands and anterior portion of the lower jaw.

All three cases did well and left the hospital in from four to six weeks.

These operations were performed more for relief from present and future pain than with any expectation of a long freedom from recurrence. He anticipated great relief from the severe pains produced by gradually increasing pressure on the nerves, especially the gustatory, and thought that in the event of recurrence, even if it occurred in the mouth, the pain would be very much less than in the case of no operation having been performed.—*Lancet*, Oct. 25, 1884.

VI. IGNI-PUNCTURE IN HYPERTROPHY OF THE TONSILS. DR. DE SAINT GERMAIN. The tonsils have a physiological rôle; they should be preserved in their integrity, or submitted to reduction by atrophy, rather than by resection; the latter process is attended with some risks of hæmorrhage, and even of invasion of diphtheria. The great desideratum for the operation is a good buccal speculum, which keeps the mouth open to its maximum, keeps down the tongue and lights up the buccal cavity. The speculum of Malthieu is recommended. It is made of a bracelet, slightly flattened above and below, presenting at its lower part a projection intended to depress the tongue; it is retained in position by a notch projecting on the upper surface which catches behind the incisors. With a good view of the tonsils thus obtained, and no danger of burning the mouth, apply the thermo-cautery at dull red heat at two or three places on the inner surface of each tonsil to about one centimetre in depth. There is scarcely any pain and no difficulty in feeding, and no hæmorrhage after. At the end of a week the tonsils (the data show) are generally reduced to about one-third their original size—a second, and sometimes a third, application of the cautery being necessary to bring them to their normal size. As the pain is so slight the patients, though children, don't mind a repetition of the operation, and, on this account, an anæsthetic is not required, especially since the position of the patient and the depression of the tongue by the speculum, give rise to a tendency to dyspnœa.—*Revue Mensuelle de Maladies de l'Enfance*. 1884. Nov. F. F. SCHACHT.

VII. FRACTURE OF LARYNX—DEATH. Reported by MR. OSWALD J. CURRIE. Service of Mr. Knaggs, of the Huddersfield Infirmary. The injury was caused by a fall off scaffolding. There was swelling and emphysema of the cellular

tissue of the neck, the emphysema extending over the upper thorax. It was impossible to feel the larynx; no blood or mucus was coughed up, but there was great distress of breathing. The pulse was quick and feeble, and little air entered the chest. Tracheotomy relieved the patient, but blood and mucus constantly choked up the tube. The patient died rather more than a day after, and the autopsy revealed fracture of the thyroid and cricoid cartilages, and dislocation of the left crico-thyroid joint, with considerable rents in the mucous membrane close below the vocal cords, exposing the arytenoid cartilage and extending into the crico-thyroid membrane. The bronchi were full of frothy blood and mucus. The lungs were intensely congested. It is interesting to know that a man may live and breathe for an hour after such an injury. There was no doubt about the value of tracheotomy—the only chance in such a case. The immediate cause of death appeared to be the congestion of the lungs and inflammatory condition of the trachea and bronchi.—*Brit. Med. Journ.* 1884. 8 Nov. G. WHERRY.

VIII. GOITRE-STENOSIS OF THE TRACHEA. By DR. E. MUELLER. A few years since Rose proposed to explain the sudden death in goitre by assuming a degeneration, softening and atrophy of that portion of the trachea most compressed, and a consequently possible collapse of its walls. Kocher in 1883 disputed this and claimed that the stenosis was of mechanical origin, a result of altered surroundings. Müller takes up this question and gives the result of his examination of the twenty-one preparations of goitre-stenosis in the Tübingen collection. These had been preserved in weak alcohol, and showed various degrees of compression, limited to that portion of the trachea corresponding to the goitre.

Only one of his preparations had a known history. He finds that solid as well as cystic enlargements of the thyroid may cause stenosis. Two only were malignant growths, and these had not attacked the trachea. Two were retro-oesophageal goitres (ring form).

To determine the actual shape of the trachea it was placed in its natural position and poured full of wax or paraffine; after cooling the trachea was slit open. Ten such casts are pictured. He found that the compression was more often uniform on the two sides (scabbard form). Occasionally the air-tube takes a slightly spiral course, when the pressure on one side is above or below that on the other; again, the trachea is sometimes compressed unilaterally.

The ampulla-like dilation of the trachea below the stenosis, described by Demme and Lubke, was not to be seen on any of his casts.

Simple tactile examination of the tracheal rings showed them to have their usual firmness. Pressure on the rings, from the front backward, demonstrated a good degree of resistance, while a slight pressure against their sides caused them to yield. Their yielding thus is simply a consequence of the lateral flattening of the tracheal rings. This alone was good proof that no softening of the cartilage had taken place. Further evidence was furnished by comparative microscopical exam-

ination of sections from free and compressed rings. Exact measurement showed that no diminution of the cartilagenous substance had occurred. In nine of the twenty-one perfect normal texture was found; in the others only slight, physiological changes were discoverable, and these as well in lower free rings as in those compressed. No softening, fatty degeneration or resorption of the edges of the cartilage. In seven operations for goitre the consistency of the cartilage ring was observed and found to be normal.

Müller therefore concludes in a general way in favor of Kocher's view. Demme, it is true, found degeneration very frequent amongst the cases examined by him—eleven in all; still, Müller feels warranted, from his larger number of cases, and all negative, in rejecting Rose's theory.

As a practical application he warns against tracheotomy whenever avoidable, since the sole remaining support of the flattened rings would then be destroyed. The antiseptic method has already established the same rule.

Of eleven recent goitre-extirpations in the T. clinic, all but one healed without suppuration, and in this case alone tracheotomy had been performed.—*Mittheil aus d. chirurg. Klin. zu Tübingen*. 1884. Bd. 1. Hft. 111.

IX. TREATMENT OF CYSTIC GOITRE BY TAPPING AND INJECTING IODINE, AND ITS RESULTS. By DR. A. WOERNER. Two previous series of cases treated in this manner are referred to by Wörner. One of 24, collected by Gurlt in 1855, and another of 35, operated by Billroth. Amongst those who have most to do with this trouble, the Germans, a wide difference of opinion exists as to the relative merits of iodine-injection, incision and extirpation.

Wörner tabulates 76 cases of this form treated by injection in the Tübingen clinic since 1856. By personal examination, correspondence, etc., he was able to determine the result and treatment in all but 2. 56 of the patients were females; 20 males. 60 were between 9 and 30 years old; 10 between 30 and 47. The average amount of fluid drained from a cyst was 176 cc.; the largest amount was 840 cc. (over $1\frac{1}{2}$ pints). The latest patient included had been operated 6 months previously; the first one 28 years ago.

Necessary instruments are a trochar and a 12.0 syringe. First carefully disinfect; then tap the most prominent and fluctuating part of the cyst, avoiding all visible veins. As a rule, about 6.0 pure tincture of iodine were then injected. Strips of adhesive plaster were then applied, so that their edges lap and their ends cross at the back of the neck. Patient remains a few days in bed. Within a couple of days the tumor has usually regained its former size. In from five to twenty-eight days it begins to diminish. On the average, the process was complete at the end of two to three months. If no improvement appears in the first four to six weeks, the attempt may be considered a failure. Two trials with absolute alcohol proved failures. Cured, 45 (60.8 per cent.); improved, 11 (14.8 per cent.); died, 1 (1.3 per cent.). In place of the former tumor, a hard lump could always be felt, though rarely seen.

In six cases the procedure was repeated, resulting in 4 complete cures and 1 partial cure. Failure in the other case was due to chalky deposits in its walls. In one case a cure was effected by daily injection of 6 to 8 drops for a week. Of the 17 failures by this method, 11 were cured by incision, and four by extirpation.

Dangers are threefold: 1. Hemorrhage (rare). 2. Inflammation and suppuration. 3. Suffocation. Iodism has also been observed. A case from the year 1878 is given, where blood cyst of the neck was mistaken for a goitre cyst, and an incision led to a fatal hemorrhage. In one of his cases suppuration followed injection. In two others, despite antiseptis, inflammation of the tissues in front set in. Asphyxia followed in two, one of which was fatal. Death occurred a few minutes after an otherwise successful tracheotomy. He is inclined to explain the dyspnoic attacks by paralysis of the recurrent nerve. In his two cases unilateral paralysis had previously existed. Size of cyst is no contra-indication, while disturbance in the innervation of the larynx is. This operation should only be done where the patient can be kept under observation. Possibly, it might be preferable to use Lugol's solution and draw it off again.—*Mittheil aus d. chirurg. Klin. zu Tübingen.* 1884. Bd. I. Hft. 111. W. BROWNING.

REVIEWS OF BOOKS.

DIE TUBERCULOSE DER KNOCHEN UND GELENKE, AUF GRUNDEIGENER BEOBSACHTUNGEN. Bearbeitet von Dr. FR. KÖNIG, Geheimer Medicinalrath, Professor und Director der Chirurgischen Klinik in Göttingen, Mit 18 Holzschnitten. Berlin, 1884. 8vo. pp. 1-169.

The new light which has been thrown upon the subject of tuberculosis since the discovery of the specific micro-organism of that disease, has led to a number of important clinical deductions.

It was natural that a large part of the work in this direction should be done strictly in the line of medicine, and especially in connection with pulmonary diseases; but the German observers have called attention to the fact that the study of the local and general distribution of tubercle is one that concerns the surgeon no less than the physician. The whole subject of the infectious element in tuberculosis is one of such vital importance, and the possibilities of surgery in this connection are so great, that we cannot blame our German *confreres* for exhibiting an enthusiasm in their resort to prophylactic operations, which we do not feel, because we have not studied the question as deeply as they.

A reference to recent articles in our own medical journals will prove that the subject is one in which the American profession is considerably interested. König's *brochure* represents the more advanced ideas upon surgical tuberculosis, and will repay careful study.

It will be most convenient to divide the subject-matter of the book into four parts, the first including pathological anatomy; the second, clinical history; the third, diagnosis; while the last half of the volume may be considered as devoted to general and special remarks upon treatment.

The first section (including a little over thirty pages) contains a clear, though condensed, description of the gross and microscopical appearances of tubercle in bone, its origin, course, complications, and the variations in its character. The author does not aim to present an exhaustive treatise on the pathology of the subject, but his descriptions, brief as they are, are marked by the true German accuracy.

The chapter begins with the statement that, "the two infectious diseases which most frequently attack the bones"—the acute represented by osteo-myelitis, and the chronic by tuberculous osteitis—present many analogies. The great difference between them is, that while osteo-mye-

litis prefers the shaft of the bone, tubercle generally attacks the spongy portions.

Referring to the microscopic appearances of tubercle, the writer says these form the most conclusive evidence in case of doubt. We should prefer a more definite proof, however, than that presented by figure 3, before deciding as to the presence of the condition.

Several pages are devoted to "tuberculous necrosis," in which some fair illustrations have been introduced. The author remarks upon the peculiar shape of the sequestrum in these cases, which "very often has the shape of a wedge, with its base towards the joint, and its apex towards the medullary cavity."

Because of the resemblance of these sequestra to infarcts, the ingenious theory is advanced that the former are, like the latter, of embolic origin. These emboli are tuberculous in their nature, and, being carried from the lungs (or other distant organs) plug the nutrient vessels of the bone, causing limited necrosis. The question is raised whether the granulations thrown out at the edge of the necrosed bone are simple or tuberculous; the opinion is expressed that they can not be tuberculous, because the inflammation shows no disposition to spread into the healthy bone, as would be the case if the granulations contained an infectious element.

These foci of tuberculous inflammation may heal through the transformation of their tuberculous into simple granulations, which latter may cicatrize as in ordinary inflammatory processes. But this healing is sometimes only apparent; the tubercles still remain, and a fresh inflammation may be lighted up at any time ("recurrent tuberculosis.") The author states that he has never seen this curative process occur in any case in which a large sequestrum had been formed.

He approves of the division of osseous tuberculosis into the "dry, granulating variety, which tends to the formation of cicatrices," and the "soft form," which soon becomes cheesy or purulent. This distinction, he claims, is clinically, as well as anatomically, true.

The first variety is strictly localized, while the second is prone to spread rapidly from the bone to the surrounding parts.

Why one case of tuberculous inflammation should be dry, and the other soft, we can not explain. The author remarks, suggestively, that the rapidity with which the latter runs on to the formation of abscesses, leads to the inference that some peculiar infectious element is present aside from the tubercle, but on inoculating animals with the cheesy material, nothing but pure tubercle results. These two forms preserve their original characteristics, that is, the dry tubercle never becomes soft, and vice versa.

"We need not insist," concludes Koenig, "on the fact that these re-

lations are of great importance in establishing the prognosis of these local processes. They are, moreover, important as regards the question of general infection in tuberculosis." (Page 11).

A third variety of tubercle is described, which the author denominates the "infiltrating, progressive form." It manifests itself as a suppurative inflammation, which begins in the articular end of the bone and spreads rapidly, destroying the cartilage and spongy bone, and finally invading the shaft, and especially the medullary cavity. The entire bone becomes riddled with foci of tuberculous matter, so that the process may be described as a true osteo-myelitis tuberculosa purulenta. It is in such cases that conservative surgery achieves its most brilliant results.

The entire paragraph in which this disease is pictured is highly graphic, and exemplifies well the author's clear, concise style.

The subject of cold abscesses is next discussed. Figure 6 represents a portion of a pyogenic membrane from a tuberculous abscess.

Stress is laid upon the fact that the difference in the importance of these abscesses in bone depends upon the fact whether they do or do not eventually rupture into a joint.

On page 16, Koenig enters at length into the subject of the anatomy of articular tuberculosis. He makes several rather sweeping assertions here, not the least of which is the statement that tumor-albus is only a manifestation of tubercular disease. A large number of cases of synovitis, he asserts, have a similar origin.

Referring to the latter condition, the remark is made that the presence of loose bodies in the joints should at once awaken a suspicion of tuberculosis (!) We doubt if many English and American surgeons will share this opinion. Moreover, purulent synovitis, according to Dr. Koenig, is a common accompaniment of miliary tubercles of the synovial membrane.

As regards the question of single and multiple foci, the author thinks that in general in the dry, or "granulating" forms of tubercle they are multiple, while in the soft, or "sequestrating" variety they are more often single. The progress of a tuberculous focus, and its ultimate communication with a joint, are referred to, and the resulting change in the joint itself is next described, figure 8 serving as a good illustration.

In discussing "par-articular" abscesses (page 23), Koenig scouts at the idea that such conditions can arise simply from "inflammatory irritation" propagated from the neighboring joint. In his opinion they must result either from direct extension of the inflammation, or from rupture of an intra-articular abscess; he acknowledges, however, that it is not always possible to demonstrate the direct connection between the osseous and extra-articular lesions.

The important question is asked, "Can the affection spread from the joint or the bones, as a general tuberculosis?"

He proceeds to demonstrate anatomically the affirmative side of the subject, beginning with the dogmatic assertion that tubercle is disseminated by means of the lymph-vessels, because in cases of tuberculous disease of a limb he has always found tubercles in the swollen lymphatic glands, which were situated just above the seat of the disease. In tuberculous affections of the hip-joint, moreover, he has observed a direct extension of the specific inflammation to the peritoneum, and thence throughout the body. In diseases of the upper cervical vertebræ we frequently meet with tuberculous meningitis, he says, but he does not explain how these facts support his theory of the lymphatic distribution of the disease.

As a third clinical manifestation of tubercle, attention is called to the nodular form which is occasionally seen. From the author's description these isolated masses would seem to be analogous histologically to nodules of connective tissue seen in so-called fibroid phthisis. He speaks of these growths as "a local infection of the synovial membrane," and regards them as the points of origin for the loose bodies found in joints. This chapter closes with some important statements concerning the identification of tubercle by means of its characteristic bacilli.

The writer says that they are generally few in number in osseous tuberculosis, and that they are frequently absent in undoubted cases. For a German his conservative views on this subject would be regarded by some of his more enthusiastic countrymen as decidedly heretical. The microscopical appearances of tubercle, he claims, are so characteristic, that they cannot be mistaken. We are surprised that he has not added the caution that giant-cells are of quite as frequent occurrence in sarcoma as in tubercle. In all cases of doubt as to the nature of a collection of cheesy matter, we should resort to experiments upon animals; but even negative results, the author insists, do not prove the absence of tubercle.

In concluding the first part of his subject, Dr. Koenig predicts that "many cases of so-called old caries will entirely disappear from the surgical stages."

From this remark and from many others which are scattered throughout these introductory pages, the reader is left in serious doubt as to whether the author admits that any chronic bone-disease is non-tuberculous.

In the second part of the monograph (pages 32 to 50 included) the clinical history is discussed. It is called the "Clinical History," and yet a more appropriate heading would be "The Pathology of Tuber-

culosis," since it consists of generalization upon the disease, rather than of a description of its course in particular cases.

"Is there a primary tuberculosis of bone?" is the question propounded at the outset. Koenig differs from many surgeons in offering that there is. He thinks that over 20 per cent. of the cases are of this nature. In the majority of his own cases the lungs were primarily affected, so that the affection of the bones was to be regarded as "metastatic." A slight injury in a tuberculous patient may establish a *locus minor resistentie* in a joint, in which tubercle at once develops. "As a rule," he says, "the traumatic is a metastatic tuberculosis." Strangely enough, Dr. Koenig appears to deny the element of heredity, although he speaks of a "predisposition" to tubercular disease; its infectious character he regards as highly probable. Scrofula is to him a nonentity; the word should be abolished. "Scrofulous" is identical with "tuberculous." This is rather radical teaching, and moreover it is not scientifically correct.

"Lupus," he boldly claims, "is a tuberculosis of the skin," as proved by its clinical history, as well as by its gross and microscopical appearances. Why it should remain so strictly localized, he does not pretend to explain. He is not very consistent in referring to the *bacillus tuberculosis* as the direct cause of the metastatic infection, since he had previously mentioned their frequent absence from the foci in bone.

As regards the cause of local tuberculosis, Koenig believes that the inflammation may either be arrested entirely, or remain latent for years, until again aroused by some slight injury. He emphasizes the fact that the greatest danger in tubercular affections of the osseous system lies in the tendency to a general dissemination of miliary nodules. The rapid and wide-spread distribution of the tubercles he considers a strong argument in favor of his metastatic bacillar theory. He acknowledges that the occurrence of general infection from a local lesion is rare. Several of his own cases developed general disease soon after operation, "just as if the affection was directly inoculated through the act of operation." The important statement is made that during the past two years, since the author has observed strict antiseptic precautions, he has not had a *single case* of general infection. The practical question, which he very pertinently asks, is whether the operation does not more often *cause* acute miliary tuberculosis than it prevents it?

In describing the clinical appearances of the disease, three groups of cases are mentioned, viz.: 1. Tuberculous synovitis. 2. Fungous tubercular disease. 3. Cold abscesses of joints. Under each of these heads are further subdivisions.

We need not refer to the author's method of examining diseased bones and joints, since it does not differ from that usually followed by

surgeons. The matter of diagnosis and differential diagnosis is passed over very superficially. We confess that Dr. Koenig has not made it clear to us by what signs he distinguishes a tuberculous from a simple arthritis. His description of the *hydrops articuli tuberculosis* corresponds perfectly with that of a simple synovitis, and we have seen non-specific osteitis which would tally exactly with his picture of the tuberculous form. How shall we decide, except on general principles? Dr. Koenig does not tell us. By a cold abscess of the joint we must understand the author to mean, not a purulent synovitis, but a tubercular osteitis, which discharges into the joint.

In reviewing the general remarks on the treatment of these several conditions, we cannot but remark upon the heroic measures recommended in cases of *hydrops articuli*, "under all circumstances"—free lateral incisions, and the removal of the diseased synovial membrane. The writer states that he has dissected out a piece as large as the hand (!), without interfering with the function of the joint.

The short section upon diagnosis is the least satisfactory portion of the book. It begins with the assertion that there ought not to be any doubt about the diagnosis, but concludes by leaving the reader in very serious perplexity. We shall not enter into the subject at length, but simply state that the author distinguishes tuberculous from simple synovitis by its obstinate character, the turbidity of the fluid, the presence in it of bacilli (rare), the occasional occurrence of nodular swellings, and, lastly, by the condition of the patient's lungs.

Prognosis he sums up in the sentence: "Tuberculosis has in no organ a typical course." In short, the prognosis is doubtful, since in the majority of cases the local disease is metastatic, and not primary.

The chapter on treatment is a most suggestive one—it may be characterized as eminently surgical in its line. Dr. Koenig has no faith in drugs, change of air, or the usual routine methods of physicians. There is no specific for tuberculosis, he says, in dismissing this branch of the subject.

In his surgery the author is at once conservative and progressive. He resorts to the knife only when the uselessness of milder methods has been positively established; but, having undertaken an operation, he insists that it shall be a radical one. "Operative measures in arthritic and osseous tuberculosis should be undertaken only on the ground of the local condition, but not with a view to the danger of general infection arising from the local treatment." In other words, as we infer from this rather obscure sentence, if the necessity is recognized, operate fearlessly, without being deterred by the possible danger of general tuberculosis.

In what cases should an operation be advised? "Every large focus which has been diagnosticated within a bone, in the neighborhood of a joint, or within the joint itself, requires an operation for its cure" (page 98). This is certainly a clear and intelligent rule.

We cannot discuss at length the author's position, which he maintains with great earnestness and no small degree of common-sense. Briefly stated, he believes that the most radical measure is the best, whether it consist in simple removal of the diseased bone by means of the spoon and chisel, in resection, or in amputation. The latter operation he reserves for cases of advanced phthisis, with metastatic deposits in the bones. In all cases he pleads for a thorough exposure of the disease by means of free incisions, and speaks with strong disapproval of the custom of introducing a spoon through a small external opening and scraping away blindly, at the risk of injuring healthy bone. The author's own method of procedure is described at length; no reader will deny to it the virtue of thoroughness, whatever may be its objectionable features. His remarks upon resection are very good, as well as the comparison between this measure and amputation. The key-note of his treatment seems to be—remove soft parts (especially the diseased synovial membrane) freely, but spare the bone. Sacrifice only what is positively necessary.

Kœnig is an enthusiastic advocate of the use of iodoform, which he employs freely, not fearing to apply from five to ten grams to a joint-cavity. He claims that with this treatment there is less shock after operation, the dressings need not be disturbed except at long intervals, there is less danger of general infection and of local recurrence of the disease—in short, his mortality has been greatly diminished since he began to use the drug. On the danger of iodoform-poisoning he touches but lightly.

With this chapter closes the general discussion of the subject; the concluding fifty pages are devoted to the diseases of special joints. These need not detain us long. Prominence is given to tuberculous cavities, of which the author recognizes a light and severe form. The former may "heal without impairment of the functions of the joint." The reader might be inclined to question the correctness of the diagnosis in some of these cases. The symptoms given for the more serious varieties are those commonly assigned to hip-disease. The treatment is conservative at first, but an early resort to resection is advised in case of abscess. Out of one hundred and twenty-two cases, he operated in fifty, or nearly one half. An ingenious method of preserving the great trochanter, with the attached muscles, is described and figured (Fig. 11). Stress is laid upon the necessity of thoroughly scraping out the diseased acetabulum, and removing every vestige of the infected

synovial membrane. The after-treatment consists in fixation and extension by a weight and pulley. No statistics of the author's results are given, although he affirms that they have improved vastly since the introduction of iodoform. He mentions several varieties of tuberculous disease of the knee-joint. In about one-third of the cases it begins in the synovial membrane. The treatment consists in thorough removal of the disease, resection being favored. Since Volkmann and himself introduced the practice of dissecting out the synovial membrane, Dr. Koenig thinks that this operation has become much more successful.

In disease of the tibia-tarsal joint, fixation by means of plaster of Paris is enough in light cases; if an operation is resorted to, it should be limited to a removal of the diseased bone. It is often safe in these cases to amputate at once. In 50 per cent. of his own operations the result has been perfect. When referring to disease of the shoulder-joint, the writer expresses surprise that any surgeon should doubt the presence of tubercle in cases of so-called "caries sicca." He waxes quite warm in the defence of his favorite theory, and ridicules the idea that the absence of bacilli should influence the surgeon's diagnosis. The bacillus, with Koenig, is evidently a strictly medical parasite. Resection is strongly advised in the shoulder, also in the elbow-joint, where it is a mistake to temporize. The wrist-joint is not mentioned.

We have given only an imperfect sketch of this thoughtful and brief monograph. Its clear and vigorous style can only be appreciated by a personal reading. The book is a modest and unpretending one, but it represents a large amount of study and experience. It is bright and original, thoroughly surgical in its tendency, enthusiastic (even one-sided) in many of its theories, but suggestive and readable.

We miss in it that prolixity which detracts from the value of many German monographs; it is written by a practical surgeon, a man who thoroughly believes in himself, and does not always condescend to enquire into the possibility of his being in error, but so honest and straightforward are his statements, that we can not but accept them as the results of his own experience.

We desire to call attention to another point in favor of the book—the absence of long and involved sentences—a singular virtue in a German scientific work. This fact alone, aside from its brevity and compactness, should render it popular with English readers.

H. C. CCE.

MINOR CONTRIBUTIONS.

THE FRENCH CONGRESS OF SURGERY.

Meeting to be held in Paris during Easter week, 1885. Sessions at the School of Medicine daily, from 9:30 A. M. to noon, and from 3 to 6 P. M.

The sessions of the Congress will be public. All the communications and discussions will be in French.

All Doctors of Medicine may become members of the Congress, by having their names inscribed on the roll of the Congress, together with the payment of an annual due of 20 francs.

Subjects for Discussion at the Congress of 1885:

I. Etiology and Pathology of Infectious Surgical Diseases, with especial regard to the Respective Rôles of Micro-organisms and of Chemical Poisons in the Production of the Phenomena of Septic Diseases.

II. On the Indications which Examinations of the Urine may Furnish in Surgical Practice.

III. On the Best Dressings for Use in Field Military Surgery.

IV. The Treatment of Cold Abscesses. (A distinction to be made between cold abscesses dependent on bone diseases and those not thus originating.)

V. On the Operative Indications in Deep Wounds of the Abdomen.

In addition to these subjects, the following are also suggested:

I. The Comparative Value of Iliac and Lumbar Colotomy in Cancer of the Rectum.

II. The Indications for Gastrostomy.

III. Origin and Nature of Coxalgia.

IV. The Indications for Trephining in Traumatism of the Cranium.

V. The Treatment of the Pedicle in Ovariectomy and Hysterectomy.

VI. The Operative Treatment of Tumors of the Broad Ligament.

THE MECHANISM OF FRACTURES OF THE CLAVICLE.

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THE study of the causes which produce the various fractures of the clavicle possesses an interest outside the purely mechanical and anatomical questions which it presents for solution. I believe that important assistance in diagnosis can be obtained in the more obscure injuries by a more exact attention than has been given hitherto to this subject.

I cannot endorse the statement of Hamilton,¹ that "in all cases of complete fracture with displacement, no difficulty will be experienced in deciding upon the nature of the injury." This may be true in regard to the ordinary fracture, but I have seen over and over again, mistakes and difficulties arise in the diagnosis of the fractures seated in either extremity of the bone; difficulties and mistakes which may often be avoided by a correct appreciation of the relation between cause and effect in these injuries.

The most elaborate treatise on the anatomy of the clavicle which we possess, that by Prof. Struthers,² deals at some length with these questions, and raises some of the more important subjects for discussion; but I can not help thinking that the author has confused the very causes which he attempts to dis-

¹ Fractures and Dislocations. Ed. 6, p. 200.

² *Osteological Memoirs*. No. 1. The Clavicle. Edinburgh, 1855.

criminate, confounding the terms indirect force and longitudinal force. His conclusions are but little satisfying to the practical surgeon, for, if his views be correct, the chief benefit of this study is the light which it casts on the more obscure injuries of the extremities of the bone. The following is Prof. Struther's conclusion:

"Fractures of the clavicle, it is well known, may occur at any part, as from a direct blow, but it is often impossible to say exactly in what way the injuries occurred. All I mean to say is, that from simple longitudinal force, the fracture is most likely to be through the outer part of the middle third; that is, a little external to the middle. Also, that the fracture is most likely to be oblique in the direction in which, as well as at the place where, the straight axis crosses the bone, so that the outer fragment will slip obliquely behind the inner. *On the peculiarities of the fractures through the outer third it is unnecessary here to enter.*"

It is chiefly upon these peculiarities (the fractures of the outer third) on which the Scotch anatomist "thinks it unnecessary here to enter," that the surgeon seeks for information most eagerly, for in dealing with these injuries the greatest difficulties of diagnosis exist.

Nor is the state of our knowledge as regards the fractures of the sternal end of the bone in regard to the etiology of the injuries a whit more advanced. In his able paper on Fractures of the Sternal Extremity of the Clavicle,¹ published in 1870, Prof. R. W. Smith has discussed the historical and clinical aspect of the subject, but he nowhere deals with the question of cause. The memoir of Dr. E. Delens,² published in 1873, which professes to furnish a list of the "published observations relating to fractures of the inner extremity of the clavicle," while making no mention of Prof. Smith's paper, which might have afforded him a more exact account of the displacements attending the injury than his own observation has furnished him, on the point I propose to discuss throws up the sponge and admits the author's inability to deal with the subject. Writing of the indirect causes of these fractures he says:³ "Mais dans ces cas, le mechanisme veritable de la fracture est impossible a determiner." In stating my own views I do so in the belief that any attempt, no matter how imperfect or feeble, is better than none. I feel confident that with regard to one, at

¹ *Dublin Journal of Medical Science*, Oct. 1870; Vol. L.

² *Archives Generales de Medecine*, Mai, 1873.

³ *Loc. cit.*, p. 534.

least, of the fractures, that external to the attachment of the trapezoid ligament, my observation is correct, and may often assist materially in the diagnosis of this lesion.

But I must proceed in order and examine the matter systematically.

The order of frequency of the occurrence of fractures in the several parts of the bone seems most naturally the order for the examination of the causes which produce them.

Putting aside the compound fractures resulting from gunshot or other penetrating injury, the simple fractures alone concern us at present. All admit that in any part of its length, direct blows on the clavicle give rise commonly to transverse fractures of the bone; and again, any one considering the position and relations of the bone will admit that the effects of direct injury are seen most frequently in the inner two-thirds, while the outer third rarely suffers because of its shape and mobility and surroundings. The oblique fracture, seated outside the middle of the bone and inside the attachment of the conoid ligament, is beyond doubt the ordinary fracture. In rare cases the plane of the fracture passes almost vertically through the bone, and so, coinciding almost with its straight axis, passes through the central third or more of the bone, or even further. It never passes into the region attaching the conoid ligament, hence the extremest cases owe their excess of development to encroachment on the sternal third. A simple model, of which the accompanying diagram is a sketch, serves to demonstrate the law which rules in this fracture:



FIG. I. MODEL OF CLAVICLE.

On a piece of wire, bent in curves corresponding to those of the clavicle, let a little rhomb of thin wood be set obliquely by pushing the wire through its center, inclining its acute angles toward either extremity of the wire, color its larger surfaces black and white respectively, and place it anywhere along the central third of the bone and let the acute angles

point upwards and downwards, facing the white and black sides similarly. In this position the plane of the rhomb will represent the plane of the ordinary fracture. Rotate the rhomb in either direction, and the various positions of the plane will correspond to the varieties of the ordinary fracture seen in any large collection, as long as ever the point be not passed at which its surfaces becomes reversed, so that the white side begins to look down and the black upwards.

The great rarity of oblique fracture, such as the reversed rhomb would represent, or, to put the proposition in other words, of fractures of the central third of the clavicle in which the acromial fragment is found displaced above the sternal, and to form the salient projection in the living, is such that we may put it aside at present.

The ordinary fracture then has a constant character, varying within fixed limits. To what is it due? To falls on the hand or elbow, or on the point of the shoulder, or to a crushing weight acting on the point of the shoulder. At first sight this force appears to act longitudinally on the clavicle, and such is the view commonly adopted. "This," says Prof. Struthers, "we may call longitudinal force, as it acts more or less in the direction of the bone." But on whatever part of the limb the force acts primarily, it is transmitted to the clavicle through the glenoid cavity of the scapula, and the ligaments attaching the coracoid process to the clavicle. Even where the force acts most nearly longitudinally, that is in falls on the point of the shoulder, still the path of the shock is through the glenoid, for we must recollect that the point of the shoulder is formed by the great tuberosity of the humerus, and not by the acromion, even though it be named *ακροσπωμος*. This force then is first concentrated on the clavicle, immediately internal to the conoid ligament, and so far from being longitudinal, acts rather so as to twist its outer segment on the inner. However various the accidents which produce this fracture, their action on the clavicle, always reaching it by the same route, produces results almost alike in all, and so the constancy of the plane I have noted is observed. I have not succeeded in producing this fracture on the dead body or dry bone, nor is it likely that any experimental method could be devised which would fulfil the

conditions necessary for its production, for the action of living muscles must have a large share in fixing the scapula during the accident. This difficulty in itself is evidence that the cause of the ordinary fracture is not simply longitudinal force. I shall presently show that the effects of this kind of force are very definite. I have, perhaps, said enough to show my doubt of the correctness of the theory which would place and shape this fracture in the direction in which, as well as at the place where, the straight axis crosses the bone. Next in order of frequency come the fractures of the acromial extremity external to the attachment of the trapezoid ligament. It will be seen that fractures in this position can be produced by force acting longitudinally, but that when so produced the outer fragment is usually comminuted. In the living, comminution of either fragment is not ordinarily observed, and in two examples in my possession which I myself dissected, which were ununited, there was certainly no trace of comminution. The example figured in Holmes' System,¹ however, shows that such may, in rare examples, occur.² The identity of the fractures in this specimen with those I have produced artificially will be seen by comparing fig. 3 with the illustration I refer to. So close a similarity as this, suggests an identity of cause.

But the fracture without comminution more ordinarily observed is, in my opinion, due to a constant cause, namely, a fall on the outer and back part of the shoulder in which the projecting point of the scapular spine, which marks its transit into the acromion process, strikes the ground. I have so often observed the existence of contusion or other mark in this position, or have verified the exact point of incidence of the force by this and other evidence, the presence of marks on the clothes and the patients own statement combined with pain complained of in this region, that I am convinced the cause may be regarded as constant in the fracture free of comminution. It is clear that if the experience of others confirms my observation, we have in this a valuable aid in the diagnosis of the fracture. I have not as yet seen any exception which would lead me to doubt my own conclusion.

¹ Ed. 2, vol. 2, p. 768.

² No life history of this specimen is preserved in the museum catalogue.

But the difficulty, admitting this mode of production of the fracture, is to explain how the lesion is brought about. Certainly the force is not one acting strictly longitudinally, and we shall see that when a fracture is produced here by longitudinal force, it differs by its comminution from the more common injury. The main fracture in both is transverse, and nearly parallel to the articular extremity of the bone. I can offer no better suggestion than that the injury is produced somewhat like a fracture of the lower end of the radius in falls on the wrist by "cross-breaking strain,"¹ indeed the shape of the acromial fragment suggests this explanation.

Following the order of frequency of the injuries, I must, for the present, defer stating the results of my experiments which, while they verify some points above referred to, apply chiefly to the fractures of the sternal end. I think, although high authority² objects to the division, that we have good reason for separating fractures between the conoid and trapezoid ligaments from those last discussed, and for adopting the classification of Prof. R. W. Smith. In frequency these fractures are next in order. Those of the sternal end are, I believe, the rarest of all. A series of facts suggest to me the explanation of the mechanism of this injury, but I submit them in all diffidence chiefly as aids for future observation.

1. Since the ideas expressed in these remarks became prominent in my mind, I have had three opportunities of examining this fracture in the living in which no doubt could be entertained as to its existence. In each case I was asked merely to verify a diagnosis already made by the resident staff in Sir P. Dun's Hospital, and the cases were openly examined before a large class. In each the fall which had caused the injury was one in which the upper surface of the shoulder was struck, the patients falling head foremost and striking such objects as the wing of a ladder in their fall. All had injuries of the head as well.

2. In the collection in the School of Physic I have placed a specimen of the fracture obtained from a subject which exhibited many evidences of senile osteoporosis, united fractures

¹ Gordon, *Fractures*, &c., p. 12.

² Gordon, *Loc. cit.*, page 53.

almost innumerable of the ribs, fractures of the scapula and of one clavicle, all such as accompany this affection. The fracture of the clavicle is placed directly outside the attachment of the conoid ligament, and, unlike the others, except one of the coracoid process, has no sign of union.

3. The third of the series of facts is the published illustration, the only one I am acquainted with of this injury in its recent condition, which M. Anger has recorded¹ and figured. He says:

Les os restent en rapport: cela était parfaitement evident sur la figure 1, qui represente une fracture recente observée sur le cadavre d'une vieille femme, qui avait été renversée par un voiture. La ligne de fracture était un peu sinueuse: le périoste était décollé à l'entour et infiltré de sang: à défaut des ligaments coraco-claviculaires, les fibres du deltoïd et du trapèze, parfaitement intactes, auraient suffi à maintenir les fragments en rapport.

Looking at these facts I cannot resist the idea that the collar-bone is in this injury broken, as one would break a stick on the knee, across the coracoid process.

If this be true, here again assistance to the diagnosis is afforded by a knowledge of the direction in which the force has acted. In my specimen of spontaneous fracture the limb hung, as it were, by the fibrous connections of the fragments, having broken the collar bone by its weight.

The study of fractures of the sternal end leads me to examine the next question: What is the effect of simple longitudinal force acting on the clavicle so as to break it? An appeal to direct experiment can be made. I have already hinted at its value in regard to fractures of the outer end and by way of exclusion in reference to the ordinary fracture. Place a clavicle with its ends fairly supported in the jaws of a vice whose blades move parallel to each other. Guard the articular extremities and prevent their slipping by bedding them in soft wood or lead, and screw up the machine until the bone breaks. Repeat the experiment on many bones, recent or dry, and the results appear pretty constant. First of all, in no case does the bone break at the junction of its curves, or anywhere near the seat of the ordinary surgical fracture. Most frequently the sternal end of the bone breaks obliquely (Fig. 2), the plane of fracture passing from above and behind, downwards and forwards, often

¹ *Traite Iconographique*, p. xxxii, fig. 1.

the acromial extremity external to the attachment of the coracoclavicular ligaments, or through the outer limits of the trapezoid attachment (Fig. 3).



FIG. 2. ARTIFICIAL FRACTURE OF CLAVICLE NEAR STERNAL END BY COMPRESSION IN LONG AXIS.

Most frequent seat of fracture.

In these experiments the small extreme fragments, whether sternal or acromial, are apt to be comminuted, splintering with the crushing force, but the larger fragment remains entire. If we look to examples which present only fracture at the sternal



FIG. 3. ARTIFICIAL FRACTURE OF CLAVICLE NEAR ACROMIAL END.

end, the more numerous cases, we are at once struck with the similarity between the experimental results and the examples of fracture of the sternal end of the bone recorded in the standard authorities and found preserved in our museums. I know of no specimen of a transverse fracture occurring in this position which has been examined after death; the total number of oblique fractures so investigated is but small. I am certain that the transverse lesions exist, for in the living they have been observed sufficiently often; the greater frequency of the oblique is clearly indicated by their being alone present in our museums.

In either form the displacement of the acromial fragment when it occurs is constantly downwards and forwards; in experimental fractures the path of the oblique plane which the fracture follows is constantly in this direction, starting external to the attachment of the rhomboid ligament to the bone, it passes downwards and forwards, and may reach the margin of

the sternal articular surface. From this fact, constant in the pathological and experimental lesions, the displacement and the deformity simulates that of the dislocation of the sternal extremity of the bone forwards. If the path of the oblique plane intersect the articular extremity, one diagnostic sign between the dislocations and fracture necessarily disappears, for the test of measurement fails, the outer fragment containing the entire length of the clavicle measured along its anterior surface. This constancy of the displacement has been suggested in the question put without answer, by Malgaigne—Is it constant? More confident, and instructed by an experience of nearly twenty years' study of the subject subsequent to Malgaigne's publication, Prof. R. W. Smith answers the question positively: ¹ "In fractures of the inner extremity of the clavicle the nature of the derangement of the acromial fragment is uniform and its direction constant, viz., forwards."

A different conclusion has been arrived at by Dr. E. Delens in his original memoir,² published in 1873. He makes no mention of Professor R. W. Smith's paper, but fortunately gives us exactly the grounds for his conclusion. Speaking of Malgaigne's opinion, indicated by his question, he says (*loc. cit.* p. 532): "Les faits ne nous semblent pas justifier cette opinion."

He would appear to have been led into this error most curiously by a statement and the illustrations published in the second edition of M. Nelaton's *Elements de Pathologie Chirurgicale*, by its editor, M. Péan, who has apparently been deceived by his own illustration of the injury:

"Quelquefois un déplacement inverse se produit comme on le voit sur la figure 99." (p. 289.)

But "figure 99" shows beyond question that the displacement in the specimen was not "inverse," but normal, the acromial fragment being displaced forwards. The figure being turned upside down has served alone to lead the author to make this mistake; but Dr. E. Delens follows it up with a vengeance, and with an ingenuity most remarkable. He has found on page. 287 of the same book another such inversion,

¹ Dublin Journal of Medical Science, Vol. L., 17, 1870.

² Archives Generales, Mai, 1873, 529.

and, eager for examples, gives us from "Holmes' Surgery" (2nd ed., 711, p. 76) and from Gurlt (2 part, p. 591, fig. 59) other two examples. In each and all these instances the inversion is of the illustration only, not of the displacement. It seems strange that an author undertaking to write a monograph on fractures of the sternal end of the clavicle should have paid so little attention to the anatomical form of the bone as these repeated errors indicate. He has, however, served to demonstrate most conclusively the truth of Prof. R. W. Smith's



FIG. 4. ARTIFICIAL OBLIQUE FRACTURE OF CLAVICLE NEAR STERNAL END.
(From longitudinal force.)

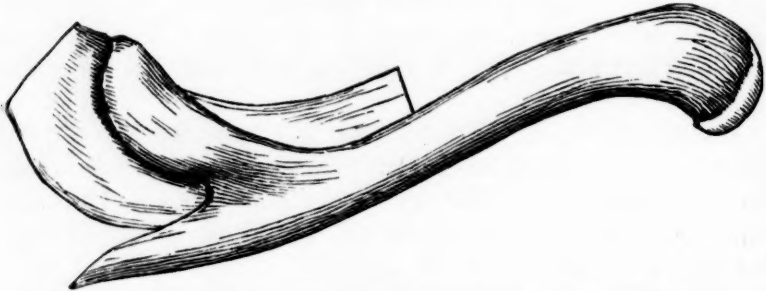


FIG. 5. SPECIMEN OF UNITED OBLIQUE FRACTURE OF STERNAL END OF CLAVICLE.
(Obtained Post-mortem.)

answer. In the accompanying illustrations I can show how exactly the fracture, inflicted by longitudinal force experimentally, repeats the lesion observed post-mortem, figures 4 and 5 being sketches taken from the bones of the same subject; figure 5 the united oblique fracture; figure 4 the corresponding bone broken in the vise. No more close likeness could well be imagined between the effects of force causing fracture in the living and dead bones than these specimens present; com-

paring them with figure 2 and with the series which Dr. E. Delens has so carefully tabulated for us, we may with great confidence conclude that the oblique fracture of the sternal end of the clavicle results from force acting longitudinally on the bone. Nor need the rarity of the injury in the living surprise us when we reflect how difficult it is to discover a method by which such a force could take effect in the living.

ON THE LOCAL LESIONS CAUSED BY THE
ALKALINE SALTS OF CHROMIC ACID.

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IN the *Lancet* of January 28, 1882, p. 169, a letter appears from the manager of some Chrome works in Russia, detailing the symptoms with which his workmen were affected in consequence of the action of bichromate of potash upon the cartilage of the septum nasi, and asking for further information and advice upon the subject.

At a meeting of the Medical Society at London on the 27th of February, of the same year, a paper was read by Dr. Richardson upon "Bichromate Disease," and this paper is practically reproduced, with additions, in a suggestive article on "Diseases from Bichromate of Potassa, a study in Industrial Pathology," which appears in the October number of the *Asclepiad*.

His description is drawn partly from an account written by M. M. Chevalier and Bécourt, who derived their information from the manager of a chromate factory, and partly from observation of patients of his own. But it does not appear that he himself has seen the lesions described by the French reporters, as the symptoms presented by his patients were very different, and appeared to be of a lower grade of intensity. This difference

was no doubt due to the fact that the patients seen by Dr. Richardson were workers with bichromate solutions, say of about 5 per cent. strength, and that those seen by M. M. Chevalier and Bécourt were workers in a bichromate factory where the solid salt, or the concentrated "liquor" was the irritant substance. This, indeed is the explanation offered by Dr. Richardson himself, who says, apropos of the first case he saw: "The case was one in which the disease that was presented was obviously from the action of the bichromate, but strangely, it differed entirely from what Chevalier and Bécourt had described, and, in fact, was a new form of disease altogether. It was a cutaneous disease, and contrary to the opinion of the above named authors, was produced by the application to the skin of the bichromate in a watery solution containing from 5 to 6 per cent. of the salt."

In the course of last summer the present writer had an exceptionally favorable opportunity of examining a large number of factory hands who were exposed to the action of the bichromates of potash, soda and ammonia in a concentrated form. The effect of these irritants was to him at that time perfectly new, as he had not happened to come across the articles in which Dr. Richardson had previously drawn attention to the fact, nor the letter of the Russian manufacturer, and the following short account was written in the belief that it was one of a hitherto undescribed factory disease. It, however, tallies so closely with the article in the *Asclepiad*, and especially with Chevalier and Bécourt's account as therein given, that it may have some interest as independent and supplementary evidence, at the present time, when attention has again been called to the nature of bichromate poisoning.

The following is a *verbatim* account, written in the direct oration as it was read before a students' medical society:

"CHROME HOLES."

"The manufacture of the potash and soda salts of chromic acid, and of the acid itself, is confined to a very small number of chemical works. I believe not more than five or six in the whole world. The monopoly is therefore a very close and valuable one. The processes are as far as possible kept secret, and visitors are not, as a rule, admitted within the works.

During the past summer, however, I had an opportunity of examining a large number of work people employed in one of the largest chromic works, and of making enquiries into some results of working in the factory, which I had before heard of, but which, in consequence, probably, of the closeness of the trade, have not yet, so far as I know, been described. The characteristic lesions manifested by those who have to handle the "chromic liquor" (the hot solution of chromate of potash or soda), or the solid salt, or who are exposed to the action of the particles suspended in the air, are firstly, a peculiar gummatous looking *ulceration of the skin* and of the parts beneath; and secondly, a still more characteristic *perforation of the cartilage of the septum of the nose*, to which the men themselves give the name of *Chrome Holes*.

"As regards the ulceration, this generally results from the contact of the liquor, with an abrasion of the skin, but sometimes there has been no previous breach of surface. In either case, a small painless ulcer, with a serous, thin discharge, and without granulations, is formed in the midst of a raised area of infiltration, the whole bearing a strong resemblance to a suppurating gumma. As the ulcer runs its course, however, it becomes deeper and deeper, but does not spread, and as the induration subsides it comes to appear to be more like a perforating ulcer, with which its painless character well accords. One point, all the workmen I questioned were agreed upon: namely, that these ulcerations always went down to the bone before they began to heal, but that necrosis never occurred. Further, that as soon as the bone was reached the sore began to clean, and that when healing had once begun it was very rapid. The only method they know of stopping this course of events consists in putting a drop of strong sulphuric acid into the ulcer. As far as I could judge, the perforating character of the ulcer was as universal as was stated. I saw many in which a small patch of a phalanx, or metacarpal bone, or of one of the bones of the fore arm was exposed, but I saw no traces of caries. Tendons are perforated, and the fingers often much crippled, but nothing like whitlow, or other diffuse inflammations, seems to occur. The whole process of the ulceration from first to last, takes two or three months, and however deep the destruction may have been there is very little scar left.

But the second lesion, "chrome holes" proper, although the term is applied to the ulcer also, is still more characteristic, and is remarkable in its universality. Indeed I failed to find a single workman who had been in the chromic works for more than three months in whom it was absent.

"In an early case, if the nostrils be examined, there will be found two round ulcerations with their bases covered with a grayish white pellicle, like that of a syphilitic ulceration, situated symmetrically one on either side of the septum nasi. The situation is invariably the same, bounded by the oclumna nasi in front and the bony septum behind. The ulceration steadily deepens, and by the end of the first year a small perforation is present. This now rapidly enlarges until it occupies the area of the ulceration, and then invariably stops—the bony septum nasi never becoming involved. This arrest is not merely a cessation of the spreading, but of the ulceration itself, the mucous membrane of the two sides of the septum blending with each other at the perforation.

"The process is painless throughout, and inasmuch as neither the nasal bones nor the columna are affected, there is no visible deformity.

"The possession of a complete "chrome hole" appears to be looked upon by the men as a thing to be somewhat proud of as an indication of experience and seniority, and many of them are in the habit of carrying a piece of bent wire in their pockets, which for their own or their neighbor's amusement, they pass through the aperture, up one nostril and down the other.

"No doubt the cause of this perforating ulcer is the same as the perforating ulcer on the skin, namely, the irritation of the particles of chrome salts; in this case inspired by the nostrils or carried there by the fingers, but it is not easy to explain the absolutely constant locality of the lesion, nor its equally constant limitations. I enquired as to whether other cartilages, such as those of the larynx and trachea, or of the ear, were ever affected, but I could only hear of one doubtful case in which there was a perforation of one ear, and the symptoms of laryngeal ulceration of any kind were quite absent. The superficial resemblance of a worker in a chrome factory to a subject of tertiary syphilis is very marked, but it is on the surface only. The skin ulcerations are *not* gummatous, nor does

the perforation of the septum follow the course of syphilis. Nevertheless, bearing in mind that the potash salts of chromic acid have been used in syphilis with some reported success, there may be enough likeness to furnish another illustration for the benefit of the homœopathists."

The foregoing perfectly independent report tallies almost exactly with the previous accounts of the disease contracted at chromic works in France and in Russia, especially with regard to the perforations of the nasal septum, and to the fact that the surface ulcerations went down to the bone before healing commenced. These reporters further say that when the ulceration attacks the neighborhood of the glans penis it presents a strong resemblance to the lesions of syphilis, so that it may be supposed that the quasi gummatous infiltration noticed in the report here given, was also present in the French workmen. The writer has heard of one case in which the resemblance was so great that a certificate of the ulceration being that of acquired syphilis was granted by a medical man. The patient had been recently married, and much unhappiness resulted from the unfortunate error in diagnosis. In opposition to the French report we have the striking painlessness of the majority of the ulcerations observed, and that a preceding scratch did not seem necessary. The peculiar cessation of the ulcerative process in the nose as soon as perforation is established with the immunity of the nasal bones, preserving the contour of the face, is inferred rather than distinctly stated. It is, however, recorded that "in every case in those men in whom the septum was entirely removed, nasal catarrh was absolutely unknown."

The present writer has seen no cases of the painful eczema so vividly described by Dr. Richardson as the result of bichromate in its less concentrated solutions, but these solutions are not found in the factories. So far as was observed, the soda salt appeared to be as irritant as the potash one. It would doubtless be not difficult to draw up rules which, if followed, would secure immunity from the action of the irritant particles of the chromate salts drawn into the nostrils, or from their concentrated solutions (the chrome liquors) when applied to the skin, but judging from the complete indifference displayed by the men, and from the absence of general constitu-

tional disturbance or pain, it is very doubtful if any regulation which would be in the least irksome could be enforced, except with great difficulty.

Dr. Richardson's "Pathological Commentary" opens up a wider field of enquiry than we are here prepared to enter upon, but it is worthy of remark that each and every one who has had his attention drawn to the lesions produced by the chromic salts, seems to have been struck by the parallelisms which the symptoms present with those of a more general pathological process. Thus the similarity to syphilitic ulceration was remarked by Chevalier and Bécourt. Dr. Richardson, going further, states: "Here is a substance, from the laboratory, of a purely inorganic character, which substance applied to the surfaces of the living body produces certain local diseases, closely similar, if not identical, with certain natural diseases, the causes of which are extremely obscure.

"The bichromate in one class of cases sets up a special ulceration of cartilage, which, once commenced, continues until the cartilage is destroyed. Again, introduced into the cellular tissues, it sets up a form of ulceration which, in some instances, assumes the character of progressive rodent ulceration. Once more, applied to the skin it sets up the symptoms which particularly characterise the time acknowledged diseases of allied type, eczema, psoriasis and pityriasis." (pp. 351, 352.)

Lastly, in the report given, which is the subject of the present article, while a similar, but narrower line of thought is followed, having for its origin the strong resemblance (though with a difference) which is shewn in the nasal perforation to the results of syphilitic chondritis, and in the ulcerations in and beneath the skin to those due to breaking down gummata. Had the cases of superficial skin affection come under notice, they likewise would, in all probability, have been compared to syphilitic palmar psoriasis.

ON EXTIRPATION OF THE KIDNEY, WITH CASES
OF NEPHRECTOMY FOR PYONEPHROSIS
AND NEPHROTOMY FOR RUPTURE
OF THE KIDNEY.¹

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IN September of last year a young woman, aged twenty-three, came under my charge at the New York Hospital for tumor in the right hypochondriac region, of which she gave the following history :

In 1876, seven years previously, she had a severe and obstinate attack of cystitis, which lasted, in spite of all treatment, for two years, when, at the Roosevelt Hospital, a vesico-vaginal opening was made to place the bladder at rest. This gave such relief that at the end of a year she had the opening closed by an operation, believing herself fully cured of the cystitis.

But this proved not to be true, for the symptoms reappeared, and six months later the wound was reopened. In September, 1880, the fistula, which had become contracted, was enlarged at the Woman's Hospital. After remaining there for some time with moderate improvement, she left that institution, but came back again in September, 1882, the irritability of the bladder being worse, if possible, than ever before. The urethra at that time was button-holed, as it is called by Dr. Emmet; in other words, an incision was made along the lower floor of the urethra, and the superabundant mucous membrane drawn out and removed. But shortly after this she had such severe pain that it led to an examination, under ether, for stone. No calculus, however, was found in the bladder, but it was observed for the first time that there was a tumor in the right upper part of the abdomen. Thinking this was possibly due to the presence of a calculus in the ureter, a sound was introduced into the right ureter through the vesical fistula,

¹ Read before the New York Surgical Society, December 9, 1884.

which had been further enlarged, but with negative results. I believe that operation for removal of the kidney was then suggested, but the patient went out of the hospital, and afterward came under the care of Dr. Peters, at St. Luke's Hospital, where an exploration with the hand in the rectum was made, and also an endeavor to catheterize the ureters. No positive evidence was obtained by these examinations. When the patient entered my ward there was felt on the right side of the abdomen a smooth, but somewhat painful, tumor, which stretched from the edge of the ribs nearly to the crest of the ilium, and which measured some four inches in its transverse diameter. This was believed, from its situation and history, to be a kidney in a condition of pyonephrosis. Aspiration having failed in extracting any pus, and, in consequence of the report furnished that the previous rectal examination had gone against the renal nature of the tumor, the patient was again etherized, and, by the small and skillful hand of Dr. Sabine, the regions of the kidneys were carefully examined, and the tumor proved to be, as thought, a diseased kidney. At the same time, by strongly holding aside the large fistula in the bladder, the mouths of the ureters could be seen and explored their whole distance by flexible metallic sounds. There was no calculus to be discovered, and while the urine from the affected kidney was flocculent from the admixture of pus, that from the left or sound side was clear and normal. On each side it was voided in intermittent jets.

The patient's general condition was fair, though her annoyance from the continued urinary leakage was great. During the time she was kept under observation before the operation urine was repeatedly examined, showing a satisfactory specific gravity and absence of casts. This increased the confidence that the left kidney was in a good condition, in spite of the statement that she had had several convulsions during the past three years. During the two weeks prior to the operation her condition began to fail, less perhaps from inflammatory than from mental causes. She was urgent for surgical interference, though aware of the danger of the procedure. An operation possessed no terrors for her, as she had already been anæsthetized twenty-times since her cystitis began. Nephrectomy was performed November 3d, under antiseptic precautions, by a lumbar vertical incision, starting just below the twelfth rib, three inches from the spine, and running to the crest of the ilium. A second, transverse, cut was made from near the top of the vertical one, outward along the edge of the ribs, nearly five inches long. This gave large access to the kidney without opening the peritonæum, which was seen at the outer part of the transverse incision, but sunk out of the way by the semi-prone position of the patient. On

exposing the dense fatty capsule, it was scratched through and the kidney partly brought into view. An aspirator showed the situation of an abscess, which was opened to determine whether simple nephrotomy with drainage would suffice. Exploration showed that it was a small cavity, and apparently others existed which did not open into the first one, extirpation was therefore proceeded with. It was at first found that the fat capsule was intimately adherent to the kidney, the true fibrous envelope of the organ was therefore split open, and enucleation accomplished with rapidity everywhere except over the anterior surface of the kidney, where the peritonæum was felt to be very thin. The pedicle was finally reached, and a loop of strong ligature silk cast around the kidney, carried to its base, and tied, after which the kidney was removed. A gush of venous blood ensued, which was only partly arrested after repeated seizures with long forci-pressure forceps, but was finally controlled by stuffing the wound full of sponges and turning the patient on her back. The shock was profound, and all the measures to produce reaction were resorted to, such as heat, stimulants, the application of Esmarch's bandages to the limbs, and saline transfusion. The latter, repeated twice to a total amount of twenty-two ounces, gave rise at first to great improvement in consciousness, pulse, and warmth of body, and up to 10 o'clock P. M. she appeared to rally, but then failed steadily, and died at 2 A. M., ten hours after the operation.

The autopsy showed that the hæmorrhage came from a vein of considerable size, 1.5 centimeters above those secured by the ligature and forceps. The fibrous capsule of the kidney was so closely adherent to the condensed fat without that it could be removed only by a close dissection. The peritoneal cavity was not invaded. The left kidney was larger than normal, and, microscopically, the convoluted tubes contained a good deal of fat in their epithelial cells. This change was quite general.

The removed kidney, slightly larger than natural, was riddled with abscesses, which did not communicate one with another, and only partially with the pelvis. There was no serviceable kidney tissue to be found in the organ.

REMARKS.—The operation of nephrectomy, first resorted to intentionally by Simon,¹ in 1869, has now been performed, so far as I have been able to investigate, some one hundred and fifty-two times,² with a gross mortality of seventy-six deaths,

¹ Wolcott, of Milwaukee, was perhaps the first to remove the kidney, in 1860, for a carcinoma. The patient died on the fifteenth day.

² The original collection of one hundred cases by Harris, in the *Am. Jour.* of

or fifty per cent. Nor has the mortality decreased in the last fifty cases, as might have been expected. It is, therefore, yet one of the gravest operations in surgery.

It has been employed for the removal of healthy as well as of diseased kidneys. In the former category may be placed the extirpation for ureteric fistula, for floating kidney and for laceration of the organ. In the latter, the lesions may be embraced generally under the heads of obstructions, suppurations, and tumors of the kidney.

For wounds or lacerations the kidney has been extirpated five times (Brandt, Marvand, Cartwright, Rawdon and Bruns) with two deaths. For fistulæ communicating with the ureter, and situated either in the vagina or the uterus, or communicating externally, there have been reported nine cases, with two deaths. For floating kidney sixteen cases are recorded, with six deaths—fourteen by laparotomy and two by the lumbar incision. The mortality for this condition is so high that it would of itself discourage the operation for an affection which does not threaten life. But, since the introduction by Hahn of the plan of fixing the loose kidney after exposure by a vertical lumbar incision, by stitching its capsule to the muscular or skin tissues, the use of nephrectomy for this reason will probably be abandoned. The operation of nephrorrhaphy has been performed sixteen times with but one death—due to a fault of the operator—and with generally satisfactory results. In the case operated on in this way by myself, and published in the *New York Medical Journal* for February 17, 1883, the subsequent history was encouraging, though several months afterward the patient had a severe attack of jaundice, and some symptoms indicative of a perinephritic inflammation. These passed off and she has recently reported herself as much benefited by the operation. The appreciation of this method is, however, not yet definite, since too short a time has elapsed to determine whether the fixation produced is truly a permanent one.

the *Med. Sci.* for July, 1882, was augmented in Bolz's thesis to one hundred and twenty-one cases, which Billroth further increased to one hundred and thirty-two. Subsequently S. W. Gross collected one hundred and forty-three cases, to which I have added three performed by Dr. Thomas, two by Thornton, and one each by Boothby, Halsted, Morris and myself, which makes the total one hundred and fifty-two.

Although hydronephrosis is one of the conditions for which extirpation of the kidney is done, yet, according to the excellent remarks of Billroth¹ on the operation (from whom in part my data are obtained), the only diseases demanding the operation are neoplasms and suppuration of the kidney. It is significant that nearly one-third (twelve) of the cases of nephrectomy for hydronephrosis have been accomplished through an error of diagnosis, being mistaken generally for ovarian cysts.

The death-rate, whether from this cause or from the inherent difficulty of the removal of a hugely distended kidney, is very large, for, in the twenty-one cases collected by Staples,² where nephrectomy was employed, there were by laparotomy seventeen cases with eleven deaths, and by the lumbar incision three cases with one death. In contrast to this mortality are the striking results obtained by incision and drainage in sixteen cases of this affection collected by the same observer, in which there were fourteen cases of recovery and two deaths. In some of the recoveries, it is true, fistulæ resulted, but were reported as diminishing or as not troublesome. In this connection I would refer to the case of hydronephrosis³ before this society, February 28, 1882. Bergmann has also stricken out hydronephrosis from the list of diseases requiring nephrectomy for their treatment.

From the foregoing remarks it will be seen that the principal interest connected with the operation of extirpation of a kidney is associated with tumors and suppurative lesions of that organ. In respect to the nature of the neoplasms for which the kidney has been removed, it is found from the twenty-seven cases collected in Homan's⁴ article on the subject (to which I have been able to add two cases by Thomas, and one each by Vercelli, Little and Halsted, making a total of thirty-two cases), that they have been sarcoma eighteen times, carcinoma nine times,

¹"Ueber Nierenexstirpation," *Wien. Med. Wochenschrift*, Nos. 24, 25, 26 1884.

²"Hydronephrosis; A Study of Seventy-one Cases of that Lesion," by G. A. Staples.—*Jour. of the Am. Med. Assoc.*, April 19, 1884.

³*Med. Record*, May 6, 1882.

⁴*Boston Med. and Surg. Jour.*, January 24, 1884.

adenoma once, fibroma once, and of doubtful nature three times. Twenty-two of these patients died, or nearly sixty-nine per cent. This mortality, so much greater than in any other lesion for which nephrectomy has been performed, will attract attention at once, and the inquiry will naturally arise, What has been the outcome even in successful cases? This point has been well considered by S. W. Gross in the *Medical News* for June 9, 1883, who states that the disease had returned in 31.5 per cent. of the cases, and that the average duration of life was rather less than twenty-four months. Taking this fact in connection with the statement of Rohrer and Roberts that the average duration of life without operations is two years and a half for adults, and of Dickinson that in nineteen autopsies, in cases of malignant disease of the kidney, in sixteen cases secondary growths were found, the operation of nephrectomy is at first sight to be discouraged. It may be, however, somewhat premature to pronounce upon this question dogmatically until experience is increased, especially since two of the patients remained well after the operation for twenty-one and thirty months respectively. It certainly seems correct to urge that only small growths should be submitted to the operation, on account of the risks of hæmorrhage and of relapse which more decidedly belong to the larger tumors, and from the fact that in such cases the safer lumbar incision can be employed; for, in thirty-two cases, twenty-five patients were treated by the abdominal incision, of whom twenty died, and seven by the lumbar incision, of whom two died.

By the foregoing process of exclusion it is fairly well shown, I think, that the principal, if not the sole, condition in a diseased kidney that justifies a nephrectomy is a suppurative process. Under this head are embraced abscesses of the kidney, whether single or multiple, or whether in the pelvis or in its substance, or simply pyelitis from cystitis or from renal calculus, etc.

Of cases Billroth, quoting from Bolz, gives forty instances with eighteen deaths; this I have been able to increase to forty-seven cases, but, from a private communication from Dr. S. W. Gross, I can now present a total of fifty-eight cases, and from an analysis of this number I shall endeavor, if possible, to furnish a due appreciation of some of the mooted points connected with this domain of renal surgery.

The first, and probably one of the most important, considerations in connection with the operation of nephrectomy is the question of not only the existence of a second kidney, but also of its condition. Given, abundant pus with certain renal elements in the urine (and even these may be utterly absent, if the abscess does not communicate with the pelvis of the kidney), to which kidney do these characteristics point? We may not always have a tumor to determine this, and this notably in some instances of renal calculi, but, even though a latero-anterior tumor presents itself, yet the status of the second kidney should be determined if possible. Repeated examinations of the urine with absence of casts and epithelium may contribute toward a certainty, but, since we find, even with a presumably sound kidney, so frequently suppression of urine following a nephrectomy (possibly due to a weakened heart from shock) it is not to be wondered at that endeavors have been made in various ways to arrive at positiveness in the solution of this difficult point. One of the greatest arguments made in favor of the abdominal section is the ease with which thereby the existence and general condition of a second kidney is determined. This is a serious consideration, and is brought home to us, for in the cases of nephrectomy performed in this city—viz., those of Peters, Wright, Wylie, Polk, Lange (2), Thomas (3), Halsted and my own, in all eleven cases with nine deaths—in two there was but a single kidney (Polk's and Lange's). In the first there was congenitally but one kidney, and that abnormally situated in the iliac fossa, as in the specimen of a left kidney, the right being normal, which I can now show you, which was removed from a cadaver by our pathologist, Dr. Peabody, who states that it is the only example of this anomaly met with by him in over two thousand post-mortem examinations. The single kidney is found about once in five thousand bodies; hence such a surgical complication can fairly be disregarded.

In Lange's case of tumor of the kidney the other kidney was found to have been converted by previous changes into a shriveled, caseous cyst.

Undoubtedly the abdominal incision would have permitted the avoidance of this surgical error, but when we reflect on the

rarity of such complications, and on Bergmann's statement that in forty cases of nephrectomy for pyonephrosis only once was the other kidney damaged enough to be useless, and also on the mortality that has followed this method of operation for suppurative lesions of the kidney, we are forced to look about for other means than laparotomy for help in this connection. This mortality is as follows: "Of the fifty-eight patients referred to, thirty-one recovered and twenty-seven died; sixteen of these were treated by the abdominal incision, with ten deaths, or a mortality of 61.5 per cent., and forty-two by the lumbar incision with seventeen deaths, or a mortality of 42.8 per cent. Separating these cases still further it is found that fourteen of them were for calculus pyelitis, with four deaths, and that of this number only one was treated by the abdominal section, with recovery. This shows clearly that, unless, as was the fact in this case (Wright's), the diseased kidney was at the same time a floating or abdominal kidney, the lumbar incision is by all odds to be preferred, not only because it is safer but because it also permits the simpler extraction of the calculus, and with less risk from the possible urinary fistula that may result. Taking now this form of kidney lesions from the comparison of the abdominal and lumbar modes of nephrectomy, we further find in the forty-four cases remaining that the abdominal incision was employed fifteen times with ten deaths, and the lumbar twenty-nine times with thirteen deaths, again showing the superiority as regards mortality of the posterior or extra-peritoneal incision. It is true that a wonderful success has been shown by Thornton in ten nephrectomies of all kinds by the anterior incision without a single fatal result, and Tait has also from a smaller number given his authority in favor of the method; but, on the other hand, it is to be said that a number of these cases were errors in diagnosis, and unintentionally attacked, many were hydronephroses, some were tumors, and but few suppurative lesions. Czerny, who of all surgeons has had the largest experience, having removed eighteen kidneys, strongly urges the advantages of the lumbar incision, and Bilioth, in comparing the two methods, advocates the posterior operation, which he says should be used moreover, when "in doubt." The conclusion is therefore evident that for large tumors, which in my judgment negative the operation,

and where not only the size, but the amount of hæmorrhage, is to be thought of, the abdominal method is more favorable; but for small tumors, or for pyonephrosis of all kinds, with, in the last class of cases, the risk, always great, of their rupture and infection of the peritoneal cavity, this incision is not to be selected. In addition to these reasons there is another, which has recently been set before us by Lucas¹ in his excellent paper on this subject, that many cases of suppurating kidney can best be treated after their exposure by the lumbar method, by incision and drainage, and, after these measures have failed to cure the patient, then extirpation can be effected with much less risk to life. He gives six cases, of which all recovered, in which nephrectomy was done in this manner. I confess, that until the logic of his statistics and personal observations had convinced me, I had entertained a reverse idea from an experience obtained in Roosevelt Hospital in 1878. I had then a renal tumor to deal with on the left side, which, after exposure by a lumbar cut and aspiration, followed by an incision to evacuate a large amount of matter, was treated by drainage, a consultation of my colleagues having decided against nephrectomy. The patient did well for a while, but eventually succumbed to a sub-peritoneal phlegmon, which started from the kidney and descended to the pelvis. I have since watched the progress of two sinuses formed from similar kidneys, and they have each completely recovered without nephrectomy, and last week nephrotomy and drainage was done in a similar condition by my associate, Dr. Abbe, with so far satisfactory results. All these cases tend to present the claims of a lumbar incision in strong light. The question which therefore we come back to is, whether the determination of the existence and condition of the second kidney can be reliably arrived at. This is truly not easily answered.

Tuchmann was one of the first to continue and employ an instrument like a lithotrite which was intended to occlude at will one of the ureters from within the bladder. It failed to work. Later, when this question obtruded itself in the minds of surgeons, Glück suggested that a preliminary incision should be

¹ "On the Surgical Diseases of the Kidney and the Operations for their Relief." R. Clement Lucas, *British Med. Jour.*, September 29, 1883.

made in the loin down to the diseased kidney, and its ureter clamped while iodide of potassium was administered, and the urine of the other kidney was extracted from the bladder and tested for iodine. I do not know that this procedure was ever put into practice. Lange suggested an incision over the sound kidney to permit a digital examination of it. Catheterization of the ureters, practicable though difficult in the female, has been called into use, and in that sex affords some hope of certainty. In the male, however, unless through a perineal opening to guide the finger and catheter, the chances are much against its efficiency. Polk,¹ in his endeavors to avoid a repetition of his case, has devised a clamp, one blade of which is to be passed into the male or female bladder and the other into the rectum so as to compress the ureter between them. This seems rational, and may yet prove of service, though in the male, as for catheterization of the ureters, a perineal opening would probably be necessary. Struck, in 1882, by the efficiency of Davy's rectal rod in controlling the circulation of the iliac artery in an amputation at the hip joint, I thought, by broadening this rod a little, so as to compass more space, that the ureter might at the same time be occluded, and it has proved satisfactory in the single case in which I have yet employed it. In a recent number of the *British Medical Journal* is an account from Mr. Davy himself, in which he states that he suggested this application of his rod in 1873, and that he has recently used it with success.

Another expedient which attracted me yet more favorably is that presented by Dr. H. B. Sands, and is based upon his experience of compressing the iliac artery for over an hour with the hand in the rectum. This surgeon advises that the same means be used to obliterate the ureter temporarily, while the secretion from the other kidney thus separated is collected by a catheter in the bladder and examined. Unfortunately for absolute accuracy the ureter is so soft and yielding as not to be readily recognized by the fingers as it crosses the edge of the pelvis, yet several trials on the cadaver have shown me that in every instance compression of the artery with two or three fingers at the same time occludes the ureter. This method has

¹ *New York Medical Jour.*, February 17, 1883.

another great advantage, which is this, that, unless the narrowing of the rectum, which occasionally is met with, is present, the hand, if small enough—*i. e.*, less than 8.5 inches in circumference—can be introduced up to the sigmoid flexure, and thereby be allowed sufficient excursion to permit reaching the lower portions of the kidney of each side.

Reference must also be made to the device of Silberman,¹ who introduces, through a large catheter, little rubber bags, attached to slender flexible catheters, which are subsequently filled with quicksilver by a syringe and are intended to plug, by their weight, the mouths of the ureters. I have not been able to obtain any good results from this instrument.²

In a doubtful case, not otherwise to be solved, an exploratory or small abdominal incision, as advised by Tait, could be made. Billroth, it will be remembered, made such incisions twenty-seven times without harm in pyloric cancer, by which he determined the inoperable nature of the disease. The following cases of abscess resulting from laceration of the kidney illustrate the advantage of this procedure:

LACERATION OF KIDNEY—ABSCESS—NEPHROTOMY—RECOVERY.—

Mary Q., a young married women, aged twenty-six, was admitted October 6, 1884, to the New York Hospital, with the history of a miscarriage in May last, with persistent uterine hæmorrhage until August. During this time she had had repeated attacks of inflammation in the abdomen, the last of which, in August, confined her to the bed. After this she was well until her last menstruation, September 15th. After her usual flow had lasted five days, she began to have fever, with nausea and pain in the abdomen. She was admitted at first to the medical division of the hospital, where a tumor was discovered just above the right ilium, into which a hypodermic needle was inserted and a syringe-ful of pus withdrawn. Her temperature ranged from 100° to 103°, and her urination was frequent and painful, and microscopically contained pus, casts and blood. On interrogation, she positively denied receiving any injury. When first seen the tumor extended from the edge of the liver, whose dullness was continuous with that of the tumor, to nearly the crest of the ilium, and in its transverse diameter it was nearly five inches broad, painful on pressure, smooth and resisting. A hypo-

¹ *Berlin Klin. Wochenschrift*, No. 34, 1883.

² Silberman shut off the ureter twenty-seven times in the ten women and five men upon whom he employed his instrument.

dermic needle failed, on a second trial, to extract anything but pure blood. With the history given, the nature of the tumor was felt to be doubtful, as exploration *per vaginam* disclosed the adjacent parts uninvolved, and it was therefore determined to delay until the evidence of suppuration was given by aspiration or otherwise. Although her temperature range was, as before, as high as 103° F., her general condition was comfortable. Three days later another puncture in a different locality resulted in the same extraction of blood, but on the fifth day pus was obtained by the same test, the urine being, during this time, nearly normal in character. She was etherized, and in the class of students present was the patient's physician, who furnished the important detail of a kick received by her some ten days prior to her admission to the hospital from a person whom she was unwilling to implicate, whence her repeated denials when questioned. After the injury there was for two days perceptibly bloody urine.

In the hope of the abscess being a perinephritic one, an exploratory incision was made over the outer edge of the tumor, between the middle of the crest of the ilium and the ribs, so that if it were such, it might be possible to keep behind the peritonæum, and, if it were not that, the benefit of an ordinary abdominal exploratory section might be enjoyed. Before the peritonæum was fairly reached, the wound permitted a conclusion against an abscess of any size exterior to the kidney, and the finger was therefore carried into the abdominal cavity, and the enlarged and, in spots, softened kidney easily and quickly recognized. The abdominal wound was closed by silk sutures, and the patient turned over, and the usual incision, from the ribs to the ilium along the quadratus lumborum, made, the kidney reached, exposed and found so softened that with a thrust of the finger a cavity was opened containing considerable grumous bloody pus, on evacuating which a jagged rent could be felt running toward the free border of the kidney and downward, which was evidently a laceration from the kick. A large-sized rubber tube was inserted into the cavity of the abscess, and the wound antiseptically dressed. The temperature fell at once, and the patient did well subsequently, with a free discharge from the posterior wound for forty-eight hours, when it rapidly decreased. Ten days later the tumor had much diminished in size, but at its lower portion was yet tender. From the wound a probe was crowded in this direction, and gave exit to a small quantity of blood and pus, and over the probe a small rubber drainage-tube was carried, and by the thirteenth day the temperature was normal. The anterior wound healed promptly, the sutures being removed on the fourth day. The posterior wound was entirely healed November 6th.

Now, December 5th, there is felt some hardness anteriorly at the region of the lower part of the tumor, but above normal intestinal resonance. It looks as if there had been some perinephritic inflammation as well as renal.

Incidentally, in these remarks, the advantage of nephrotomy over nephrectomy has several times been alluded to or illustrated. I beg now to call attention to a further extension of renal surgery of equal interest to us all. I refer to the treatment of calculus suppression of urine.

Roberts, of Manchester, had shown that the diagnosis of such cases was not always difficult; that a history of renal colic of one side at some previous time, with a recent similar attack on the other side, with slight or intermittent discharge of urine of low specific gravity, pointed clearly to the difficulty which terminates nearly always fatally in from six to ten days. In an article on "Renal Calculi," published by me in the *New York Medical Journal*, of August, 1880, the suggestion was made that as the arrest of calculi took place, as a rule, either within the first three or four inches of the ureter or at the vesical end, relief was to be afforded either by an incision in the loin, into the pelvis of the kidney, or the distended ureter, or that, by the hand introduced into the rectum, the calculus might possibly be squeezed into the bladder, if sufficiently small.

In the *British Medical Journal* for March 8, 1884, Mr. Bennet May recommends nephrotomy for this same purpose, though he had never carried the project into execution.

Lately, Mr. Morris, in the *American Journal of the Medical Sciences*, for October, 1884, suggests the use of a perineal opening into the bladder to permit its exploration and the detection of a renal calculus when impacted at its vesical outlet, and gives a plate of an elongated gum lancet to accomplish the incision of the vesical tissue covering the calculus. I have been on the outlook for a case in which I could put into operation my surgical convictions on this subject, but its demonstration, as far as I can learn, has only been accomplished by Bardenheuer, of Cologne.

This surgeon, in a case of complete anuria, with threatened acute uræmia from calculous occlusion of the right ureter, subsequent to destructive suppuration of the left kidney, cut down

upon the right kidney by the usual vertical incision in the loin, and supplementing this by another incision parallel to the crest of the ilium. This gave a free exposure of the kidney, which was separated from its fatty capsule along its anterior face until the pelvis and ureter were reached. A calculus was felt in the ureter, near the kidney, the size of a bean; this was cut open, removed, and the finger passed upward into the pelvis of the kidney, where four other small calculi were found and extracated. The ureter was then sewed up, and the wound packed with an antiseptic dressing. The patient recovered.

THE INCISIONS.—The method resorted to in the case of nephrectomy given in this paper seems to be the best of the lumbar incisions, as it affords the greatest amount of extra-peritoneal space. The usual vertical one, running from just below the twelfth rib to the crest of the ilium, along the external border of the quadratus lumborum muscle, or about three inches from the spine, affords ample room for a nephrectomy of a normal kidney, or for a nephrotomy; but when the organ is much increased in size, additional room is desired. Enlargement of the wound upward to the twelfth rib, or by removal of the rib, is highly injudicious, as has been shown by the dissections of Holl,¹ who showed that the pleural cavity, in nearly every instance in the examination of sixty cadavers that he examined, descended as low as the first lumbar vertebra, and that the greater part of the last rib is lined by this serous membrane. Even when the rib is wanting, the pleura comes down to the ligamentous tract which supplies the place of the bone. Lange has since shown that not infrequently the pleura comes even lower alongside the spine. In the only fatal case of nephrorrhaphy (Ceccarelli's²) the kidney was attached not only to the wound, but also stitched to the twelfth rib by sutures passed around it. Acute septic pleurisy carried off the patient. Increased space can often be obtained, and safely, by cutting across the middle of the quadratus up to the spine. Also the ribs can be strongly raised by retractors. Czerny several times removed the kidney by a simple tranverse incision, running parallel to the ribs and just below them, outward from six to

¹ *Archiv. f. Klin. Chir.*, vol. xxv., 1880.

² *Centralbl. f. Chirurg.*, November 1, 1884.

eight inches. In my own case there was plenty of space created by the cross-incision, like an inverted L, starting from the upper part of the vertical one and longest in its skin divisions. This is well shown in the specimen presented for your inspection. The peritonæum was seen, but it was kept out of the way by the semi-prone position of the patient. This line of incision is also advocated by Lucas. In a comparatively healthy kidney, or where the organ is the seat of a neoplasm, there is but little involvement of the fat capsule, and it can easily be torn or separated from the kidney. In inflammatory lesions, however, this manœuvre cannot be utilized, and the capsule proper of the kidney must be incised, and the enucleation accomplished under the membrane. This may add to the hæmorrhage, but it is often impossible to do otherwise. The specimen shows this very markedly. Lucas has also advised where the hæmorrhage is severe after the ligature and ablation of the diseased mass, not to spend time in endeavoring to secure the bleeding points by ligature or forceps, but to plug the wound and check it in this way. I was struck, too late in my own unfortunate case, with the efficacy of this measure. After several attempts to seize and tie the source of hæmorrhage, found after death to be from a venous trunk above the pedicle, I plugged the wound, as will be remembered, and turned the patient on her back, when very little pressure sufficed to staunch the flow. Had this been done earlier the issue might have been different. Special care must be taken not to cut too close to the ligated pedicle. The application of a straight or curved forcipressure forceps beyond the ligature prior to the ligation is to be advised, to guard against this mishap.

Of the abdominal incisions there are two: (1) the median, running three inches above and below the umbilicus, but less, however, in women with lax bellies. Kocher, however, began his at the xiphoid appendix and ended it at the navel. (2) That of Lagenbuch, along the outer edge of the rectus in the linea semilunaris. By this latter incision the colon is promptly seen, and should be turned to the inner side, so that its posterior or outer mesenteric fold can be cut through. This insures less hæmorrhage, and avoids partially a risk that Bergmann ascribes to the abdominal incision, viz., subsequent gan-

grene of a portion of the intestine from interference with its circulation. When the kidney has been removed, Sir Spencer Wells advises the rent in the peritonæum to be closed by sutures; this cannot always be done, as the edges are often torn and irregular. There is left, necessarily, a retro-peritoneal cavity of considerable size, the care of which requires attention. This space, though left to itself by many, has given rise, not a few times, to abscess or septic processes. Brichetti, in experimenting on animals, urges the necessity of draining this cavity by a tube carried through the skin-wound in the loin. Barwell has also made a similar suggestion, and it seems based on sound surgical principles, but Boothby is the only one who has so far done this with a satisfactory result.¹

The conclusion from the broad consideration of the many cases embraced in the paper is, that the important and dangerous operation of nephrectomy can, and should be, more restricted in its application; and, for disease, that it will be most satisfactorily employed in suppurative processes which have not been relieved by the simpler procedure of nephrotomy.

VENOUS-BLOOD TUMORS OF THE VAULT OF THE
CRANIUM COMMUNICATING WITH THE INTRA-
CRANIAL VENOUS CIRCULATION, ESPE-
CIALY THROUGH THE MEDIUM OF
THE SUPERIOR LONGITUD-
INAL SINUS.

By WILLIAM M. MASTIN, M. D.,

OF MOBILE.

INJURIES and diseases of the venous division of the blood-carrying system of vessels are found, upon attentive examination, to occupy a much more general and conspic-

¹In the discussion that followed the reading of the paper, Dr. Stimson reported a nephrectomy, done in 1883, by abdominal section for a painful movable kidney, in which the posterior peritoneal opening was closed, and a drainage-tube carried from the renal cavity out through the loin. The result was a fatal one.

uous position in the extensive domain of pathology than lesions of their better-known arterial associates; for, excluding their very manifest physiological importance, with those prominent disorders of which they are the evident and well-attested seat, the light of modern medical and surgical science has clearly demonstrated that the veins are intimately connected with, or play a most active rôle in, numerous maladies which, until recently, were classed among the obscurities of medicine.

Not the least in this series are infarctions, metastases, and many forms of pyaemia and septicaemia, in which these conduits are now recognized as furnishing the principal elements in the formation of, and ready channels for floating along, the embolic masses, or disseminating the septic material throughout the system at large.

Notwithstanding this late acquisition to our knowledge, it must be conceded that clinical investigation, together with anatomical¹ and experimental research, have not yet accomplished in a full measure for the veins, *cæteris paribus*, what has been obtained for other structures and tissues composing the human frame; and, therefore, even to-day there are many facts relative to this portion of the circulation, around which still hangs the veil of doubt and speculation; and especially so as to the degree and character of traumatism which can be sustained by or inflicted upon large venous branches, trunks, and sinuses, compatible with the preservation of their functional integrity or the health and life of the individual affected.

Illustrative of this is the single example of the employment of ligation in the treatment of vein-wounds.² This procedure

¹ Breschet's *Système Veineux*, published in 1824, although elaborate, was far from being complete—leaving marked deficiencies; and it has not been followed by any very extensive inquiry in this direction.

A number of excellent and important papers on the venous circulation and distribution in *certain regions* have appeared, however, from time to time in various medical periodicals, all of which have been valuable topographical additions to our anatomical information in this department.

² Mention must not be omitted of the papers of Dr. S. W. Gross (*Amer. Jour. Med. Sci.*: 1867) demonstrating the safety of the deligation of veins; and especially the statistical collections and experiments in lateral closure of incomplete vein-wounds by Nicaise, Braun, and more recently Pilcher, and others; including the published clinical details of many cases, by both American and European surgeons, where lateral ligation was practised successfully in wounds of large veins.

was viewed in former days with such disfavor (witness, as a few among many distinguished authors, the cautions of such men as Langenbeck, Lisfranc, and Pirogoff) as to be declared always attended by dangerous, if not fatal consequences—either immediate or secondary; and, indeed, so deeply and firmly rooted in the professional mind of these times was this, which may be justly designated positive superstition, that it became a dogma which, upheld principally by a blind adherence to traditional doctrines, is still accepted with much of its original delusiveness,—largely pervading, as it does, the teachings, and governing the practice of some of the ablest surgeons of this decade.

Of all the organs and regions of the body, the veins and sinuses of the brain and its enveloping tunics have been, perhaps, the most neglected.¹

Just at this period, therefore, when a surgical revision of the subject of head-injuries (fractures of the skull and cerebral injury) seems to be peculiarly called for, and to demand an examination of more than ordinary care,—and even such a reviewing is already passing through the hands of the profession,—any marked point connected therewith, particularly if associated with the intra-cranial circulation, should be of more than common interest; and, in this connection, the lesion which forms the theme of this essay presents features doubly attractive, since in it are involved both of the above mentioned conditions.

Before entering into a full examination of the subject, I shall narrate briefly the history of the case which first engaged my attention and directed inquiry into the literature of the malady, as affording an appropriate prelude and explanatory introduction to a general consideration of the subject.

This case is as follows:

On September 10, 1881, I had the opportunity of examining Mr. W. D. Penton, a native of Florida, who visited Dr. C. H. Mastin for professional advice relative to a tumor of the head, of several years'

¹The latest important contributions to the cerebral veins and sinuses with which I am acquainted are the admirable papers of Heubner, Duret, Langer, Rüdinger, and Trolard with the recent brochure on *The Veins of the Human Brain and its Envelopes* (1884), by Wm. Brown-ing, of Brooklyn.

duration, and which had become a source of considerable annoyance and solicitude.

Inquiry elicited this history: He is a man 35 years of age, laborer, married, and the father of several healthy children. His own health has always been good, and, with the exception of frequent dull headaches, is still excellent. In appearance, also, he is moderately robust and vigorous. There is no history or evidence of hereditary disease, nor is he cognizant of ever having sustained a severe fall, or any blow or wound upon the head. When a youth, he contracted a gonorrhœa, and also suffered from a venereal ulcer on the glans penis; but now the closest questioning and examination fail to discover the slightest indication of systemic infection. About five years ago he chanced to feel a small lump, or wen-like mass, equal in bulk to a common acorn, on the left and posterior portion of scalp. This was painless, compressible—disappearing entirely on pressure, but partially redilating with the removal of the compressing force—and gave so little trouble as to render its discovery the result of the merest accident.

His attention being once called to the existence of the growth, frequent handling followed, and hence he is able to assert that the tumor gradually enlarged, until it attained its present dimensions of a large chestnut, although he is equally assured it has remained *in statu quo* for the past eighteen months. As mentioned above, his only inconvenience is an harrassing headache, which is fleeting in character—coming and going—and which he thinks is connected with the tumor, but he is unable to trace a positive or direct association therewith. He is confident, however, that the condition and size of the growth is materially influenced by a hearty meal, the recumbent and stooping postures with the head below the level of the remainder of the body, and after muscular exertion; under all of which circumstances it becomes full, tense, and decidedly augmented in volume.

A careful examination, whilst sitting upright, now reveals only a slight fullness of the scalp in the locality indicated, which readily, though somewhat slowly, disappears upon lightly-made pressure by the fingers or hand, and leaves in its stead an indentation or depression in the skull, occupying the upper extremity of left arm of lambdoidal suture. This depression is quite perceptible, and is of a triangular, funnel shape, being wider at margins (large enough to admit the tip of the index finger) and gradually narrowing down, apparently, to a single small aperture where it penetrates the bone and emerges into the cranial cavity. When the sac is evacuated by compression, the tegumentary covering is regular, lax, movable, and moderately thin, and through which the surface of the bone is felt to be smooth, and devoid of all perceptible inequalities or roughnesses. Reversing this

position, and causing the patient to recline or stoop, with his head hanging down, a round, distinct tumor is found to rise and expand steadily over the site of the indentation. It is soft, elastic, conveying to the touch the sensation of an ordinary hæmatoma or blood tumor of the scalp, not discolored, and is easily reducible, after the emptying of which, the osseous depression is again perceived. Dizziness and vertigo result if this posture, with the head lowered, is maintained for a short time. Pressure causes neither pain nor the least uneasiness—cerebral or otherwise. There is no pulsation or bruit; no appreciable effect produced by the respiratory act; but I find that any interruption to the blood-current through the jugulars increases the tension of the tumor.

The surrounding integument is unimplicated, and there is no other lesion of the head. There is disturbed cardiac action, but both heart and lungs are without organic disease. The ophthalmoscope shows the papilla and general fundus of both eyes to be normal, although the vessels of the discs are rather small and narrowed. Hearing normal.

Operative interference was deemed inexpedient; and hence the constant wearing of a small leathern pad over the tumor, to afford protection and produce even and continued pressure; the avoidance of all labor and excessive exertion; and the leading of an abstemious and regular life, was the treatment advised.

These notes furnish an accurate and excellent clinical picture, and, from a symptomatological stand-point, may be regarded as typically descriptive of this singular pathological condition.

I. LITERATURE.

As far as I have been enabled to extend my researches into the history of this interesting lesion, it appears of comparatively infrequent occurrence in surgical literature, and especially does this observation apply to surgical treatises of recent date; since, among the many late works on surgery, both special and systematic, with the vast number of journal publications, which I have examined, this affection seems to have escaped the notice of all except Dr. Gross, who is the only author referring to these formations; and even this reference made by him is exceedingly brief, and does not embody any of his personal

observations. He classes the affection under the head of *venous tumors* of the cranial bones.¹

I have succeeded, nevertheless, in finding some scant mention of these tumors by a few writers, chiefly French, prior to twenty years ago, and which, among other less distinctive terms, are described under the several designations of: *Varicose veins or venous varicosities of the skull* (Chassaignac); *Sanguineous herniae of the vault of the skull by communication, through openings in the bone, of the meningeal vessels with the exterior integument* (Dufour); *Reducible sanguineous tumors of the vault of the cranium* (Azam); and, *A new form of tumor of the vault of the cranium, produced by the blood in communication with the intra-cranial venous circulation* (Dupont).²

The last of these appellations I have adopted, with some modification, as the most fitting title for this monograph.

Furthermore, there are cases reported by Busch, Nélaton and Richard, Hutin, Percival Pott, Azam, Middeldorpf, Flint, Baron H. Larrey, Bérard (senior), and Verneuil.

These cases, not only on account of the total absence of all mention, and, I may say of, apparently absolute ignorance, of such formations by modern surgeons, but also, the interest which they present individually and collectively, are deemed of sufficient importance to bear a detailed repetition; and hence I shall not hesitate to incorporate a sketch of each one of them in this section of my subject. I shall endeavor, however, to abridge and condense these histories as much as is consistent with their proper and connected presentation, and a correct elucidation of the different salient and important points which they offer. But several of them are of more than passing interest by reason of the careful and elaborate post-mortem examinations accompanying them, and these, of course, will receive a more extended transcribing.

¹ *A System of Surgery*; by Samuel D. Gross, M. D., etc. 6th ed., vol. ii, p. 28, Phila., 1882.
² *Essai sur un nouveau genre de tumeurs de la voûte du crâne formée par du sang en communication avec la circulation veineuse intra-crânienne*,—par Emile—Pierre—Louis Dupont. 74 pp., 4to, Paris, 1858.

NOTE.—The above is a thesis, presented, for the Doctorate of Medicine, to the Faculty of Medicine, Paris, April 20, 1858, and is decidedly the most elaborate paper on the subject with which I am acquainted, and to it I must acknowledge my indebtedness for much of the material contained in this essay. In this connection, also, I desire to express my obligations to Surgeon John S. Billings for courtesies extended to me in the examination of works from the National Medical Library, at Washington.

An attentive consideration of all the cases coming under my observation discloses such a difference in their etiology, that they are naturally and conveniently separated into the following groups, viz.—*Class I.* Cases of undoubted congenital origin; *Class II.* Cases arising spontaneously, or, at least, without presenting any manifest or tangible cause; and *Class III.*, in which the cases are due to direct traumatism.

CLASS I. CASES OF UNDOUBTED CONGENITAL ORIGIN.

(1) *Case of Busch.*¹ During the accouchement of a patient, after the discharge of the waters (which were thick, greenish, and fetid), and whilst head was still at superior strait, a large, fluctuating tumor was distinguished on child's head. The child was still-born; male; weight 7 lbs.; skin detached and macerated, and limbs flaccid, showing conclusively that death had taken place some time prior to labor.

On the head there was a rather large, fluctuating tumor, of a bluish color, which, in length, extends from the external occipital protuberance to the middle of the sagittal suture, and, in the other direction, from the point of ossification of one parietal bone to the corresponding point on the opposite side, and projects the most in the region of the small fontanelle. All the cranial bones were very mobile, and that which deserves especial note, from an etiological point of view, was the absence of a defined and prominent hard ring around the border of the tumor.² The tumor was opened by a large transverse incision, extending from right to left, which discharged a quantity of dark-colored, viscous blood, and of an offensive odor. About two ounces was collected. This fluid was situated between the bones of the skull and the pericranium, and a careful examination of the line of incision showed that several vessels extending across the superior longitudinal sinus had been divided, and that the sinus was in communication with the tumor.

The cranial aponeurosis over the site of the small fontanelle was thick and soft,—being infiltrated with a gelatinous lymph,—this thickness becoming less as the borders of the tumor were approached. This thickness, also, was easily distinguishable from an ordinary tumor of the head. There was no extravasation either on the brain or dura mater, although the cerebral vessels were engorged with blood.

It should be remarked that in Pigné's account of this case of Busch's the lesion is regarded of traumatic origin, being due to the traction and pressure of the forceps employed in the delivery. But this, evidently, is erroneous, for the history given by Busch is so clear and explicit on this point that the intra-uterine death of the child, several days prior to time of

¹ *Heidelberger klinische Annalen*, t. ii., p. 249, 1826; also Pigné, *Mémoire sur les Céphalématoïdes, dans Journal hebdom.*, Sept., 1833, t. xii., p. 480; and *Thèse de M. Chassaignac, Sur les tumeurs de la Voûte du Crâne*, p. 125, 1848. Burchard, *Rech. sur le Céphalém.* (*Journal P'Expérience*, 1838, p. 292). Dupont, *op. cit.*, p. 15.

² *Note*—This reference (as remarked by Dupont) is to the very noticeable osseous ring which is so constantly found in the blood-tumors of the new-born.

labor, is not to be questioned; and hence I must consider the case, with Dupont, as one of congenital formation.

(2) *Case of Flint*.¹ He found in the occipital region of an infant, several days old, a tumor of considerable size. He opened it. It contained venous blood, which flowed out in such quantities that the infant speedily perished from hemorrhage. Examination showed this tumor to communicate with the longitudinal sinus.

(3) *Case of Verneuil*.² In 1854, a young girl, aged 17 years, of a strong constitution and good health, presented herself to me for advice concerning a tumor on the forehead which had existed from infancy. She had some indefinite recollection of a blow received in early life, but it was entirely too vague to be relied on. No evidence of hereditary trouble in any of the family, and the tumor is, evidently, of congenital origin. The symptoms are as follows: Fluctuating, soft, and round; painless; ordinarily it is of the volume of a large nut when she leans forward; and is situated on the right frontal protuberance. The skin is unaltered in consistency or color, and no vascularity of the surrounding parts. Pressure causes it to sink and disappear entirely, and after reduction one can definitely determine that there is no appreciable alteration of the bone, and only a little circular ridge around it (its limiting boundaries) is perceptible. This is rather resistant. The tumor is easily reduced by pressure, which must be steadily applied, and by this manipulation the sensation of a pouch partially filled with fluid, which empties itself, is experienced. The tumor bulges out under the influence of exertion and emotions, but there is neither bruit nor pulsation; and, again, cough does not affect it. When the head is lowered the tumor becomes voluminous, with the dimensions of 3 cm. in diameter by 1 cm. deep. In the dorsal decubitus the tumor attains a very large size, but it is largest when she sits in the sewing position with the head inclining forward. During the menstrual epochs, however, the tumor assumes, perhaps, its greatest volume, and at these periods she suffers from decided headache, but to this she is, at any rate, subject.

Later a cure took place, or, at least, the tumor subsided after a very prolonged examination with repeated palpations to which she was subjected at the Surgical Society.

M. Verneuil announces the favorable termination of this case with caution and reserve, because of his inability to verify the permanence of the cure by another examination at a more remote date; as, immediately after the subsidence of the swelling, she disappeared, and was not again seen.

(4) *Case of Middeldorff*.³ Matilda H—, æt. 9 years; daughter of a peasant living at Carlowitz, near Breslau; well nourished and developed. From birth there existed in her forehead, a little to the left of the median line, a tumor covered by the hairy scalp. It is round, smooth, and does not pulsate. Shortly after birth it was the size of a cherry, but now (1851) it presents a diameter of an inch and a half, and

¹ Pigné and Chassaignac, loc. cit. Dupont, op. citat., p. 16.

² *Bulletins de la Société de Chirurgie*, t. iv., p. 414, et suiv., quoted by Dupont, p. 22.

³ Middeldorff reports this case in a private letter to Dupont (vide op. cit., p. 26).

one-quarter inch thick. Offers different degrees of tension—one time it is flaccid and then again much distended, but there is always a little fluctuation.

Bending the head over towards the ground, excitement, etc., causes it to swell up; deep inspirations make it sink slightly; it quickly and without difficulty disappears under continued pressure, and this does not produce the least symptom of cerebral compression. After reduction the base of the tumor is found to be circumscribed by an edge or ridge three-quarters of a line deep, denticulated, and which is felt to be bony by the exploring needle. The base or floor of the tumor is formed by the cranial vault, almost flat, and without the sensation of any opening penetrating it, and is covered seemingly by a thin membrane. There are no cords or filaments to be felt in the tumor cavity except near the skin and hair line where an ovoid cartilaginous button is perceptible, which is movable and about the size of a grain of rice. In 1856, at my clinic, I examined this tumor a second time, but, with the exception of being a little larger, it presented the same symptoms; the girl, also, continuing in good health. Pressure upon the tumor, after encircling it with an ivory ring, which closely fitted its base, and pressing the ring down sufficiently to cut off the skin circulation, also causes it to disappear, thus demonstrating conclusively that the blood flows from the direction of the osseous base, and not from circumference vessels.

M. Chassaignac¹ mentions having heard Professor P. Bérard (senior) relate, during a course of lectures on Anatomy, delivered in 1831 or 1832, the history of an infant in whom there was a varicose dilatation communicating with the superior longitudinal sinus, and which swelled considerably when the child cried or made any exertion.

This is a simple statement without any careful or decided clinical details, and nothing to indicate its manner or degree of communication with the intra-cranial circulation; and hence there is an element of uncertainty and obscurity associated with it.

Dupont, however, in his reference² to the case, accepts and classes it among this order of tumors.

There seems to be no reasonable doubt about its being of congenital formation.

CLASS II. CASES ARISING SPONTANEOUSLY, OR, AT LEAST, WITHOUT PRESENTING ANY MANIFEST OR TANGIBLE CAUSE.

(1) *Case of Baron H. Larrey.*³ Val-de-Grâce, Ward 29, No. 10. O—(Antoine), musketeer of the 8th Line; æt. 23. Entered, in September, 1856, with a varicose frontal tumor, the base of which, almost circular, was the size of a five-franc piece, situated on the forehead above the left eye, partly within and partly below the hair. He had no recollection of ever having sustained any blow or injury of any kind about the head, and he had not perceived its presence until one day, at the age of 11 years, his mother asked him the cause of the swelling on his forehead.

¹ Loc. cit.

² Op. cit., p. 16.

³ Gazette des hôpitaux; 14 Octobre, 1856.

Before the army examining board he was superficially examined, accused of possessing voluntary control over the swelling, and declared fit for service, but trial showed that it was impossible for him to wear the shako.

At present the tumor is found slightly elevated above the skin-level when the patient is reclining or even standing, but it promptly increases in size when the head is lowered. There are a few ill-defined, deep blue spots on its surface; it is soft to the touch, but gives no sensation of pulsation. When sufficiently depressed to feel the bone beneath, there is discovered an irregular or stellated perforation of the cranium, and only the shape of which prevents the easy introduction of the finger therein. Compression causes no pain in the tumor itself, but does produce a little pain with a sensation of mistiness of vision in the eye of the affected side. Slight symptoms of cerebral compression are also produced by pressure upon the tumor. The day of his admission to the hospital, after a rather prolonged examination, he was seized with marked vertigo accompanied by vomiting, diarrhoea, etc. He was declared unfit for military service, and consequently discharged.

At a meeting of the Société de Chirurgie, Paris, October 1, 1856, Middeldorff referred very briefly to the case of a young girl in whom such a tumor was situated high up in the median line of the occiput, and emptied into the superior longitudinal sinus. This patient was also mentioned by him in a personal letter to M. Dupont (Op. cit., p. 26), in which he stated that, unfortunately, the clinical notes of the case had been mislaid, and hence he was unable to give, with any degree of certainty, from memory alone more than an outline of the case, with the correct diagnosis.

(2) *Case of Nélaton and Richard.*¹ B—, laundress; æt. 19; female; moderate stature and strength; chestnut hair; born at Signier (Mauche); admitted September 22, 1856, to *l'hôpital des cliniques*, bed 4 of women's pavilion, during the time that M. Richard had charge of the service of M. Nélaton, in the absence of the latter.

She gave the following history: No hereditary trouble in herself or any of her family. Never had but one serious attack of illness, and that when 4 to 5 years of age, and which was, evidently, some "sweating fever." In 1848, when 11 years old, she was seized with a violent, throbbing frontal headache, which lasted the entire night, and depriving her of sleep. The day following the pain still present, and greatly augmented when she assumed the recumbent posture. In arranging her hair on this day she lowered her head, and in doing so discovered that there was a soft point on the top of her head as large as a five-franc piece. In reply to questions her mother informed her that it had existed ever since her sickness at the age of from 4 to 5 years, at which time she first discovered it. Thus it is probably of congenital origin. She is subject to headaches which appear two or three times a month and last about a day, but uninfluenced by the menstrual epoch. Tumor has been increasing since 1853.

Examination now presents the following characters: It is situated at the summit of the occipital region over the sagittal suture—at superior angle of the occipital. When head is erect, as in standing or sitting, tumor not visible, and no projection

¹ This case was presented by M. Richard to the Société de Chirurgie, October 1, 1856; and was afterwards examined, and fully and carefully reported by M. Dupont (vide p. 28).

evident to the touch, but when head is carried forward or backward the tumor appears immediately, and is found to be globular and voluminous, with a base of $6\frac{1}{2}$ to 7 cm. in diameter. Any exertion causes the tumor to rise and become apparent, but it again subsides when the effort ceases. Uninfluenced by cough or respiration. When prominent it is soft, fluctuating, without pulsation or bruit. Natural or artificial reduction not followed by any cephalic symptom. Reduction very easy, and presents the sensation of a pouch full of liquid which empties itself steadily and rapidly. Compression of the internal jugular veins, even when head is erect, causes the tumor to rapidly fill and rise up. Again, the head being erect, a string tied circularly around the head, and the internal jugulars compressed, the tumor appears quickly and to its full size. Border of tumor smooth and nearly regular. Carefully practiced palpation shows two or three depressions which might permit communication through the cranial bone, but the curvature of the skull is unaltered. Coverings normal, without œdema or infiltration.

The inconveniences of which patient complains are the following: Vertigo, which is produced by stooping or any sudden or extended movements of the head. After each examination drowsiness followed. Only treatment to be adopted was that which would control the increase of the growth. October 3d, patient left the hospital. November 18th, readmitted. Now complains of tension and stiffness about the head, with vertigo upon each and every movement. No explanation of this in the tumor itself, but, as she is probably *enceinte*, these phenomena probably due to nervousness of pregnancy. Patient now lost sight of until December 10, 1857. The supposition of pregnancy had proven correct; and after accouchement she had an attack of facial erysipelas, accompanied by intense fever and delirium. Local state of tumor and adjacent parts modified. She had taken no precautions to arrest progress of tumor. Vertigo and other head symptoms had continued during first two months of pregnancy, and then all symptoms of malaise, etc., had entirely disappeared.

The following changes in the tumor are noted: Increased in all diameters as shown by careful measurements. The surface of the bone had no longer its normal curvature, but presented the appearance as if a chip or splinter of bone had been raised up from the cranial vault, especially at the anterior border; and this portion (anterior), also, appeared larger, as if a collection of osseous particles had taken place at this point. The rest of the border indicated no change.

In this general osseous depression the finger easily and manifestly demonstrates four smaller depressions in the bone, two of which are situated in the median line, and one on each side of that line. The median depressions are thus disposed: The first median depression is circular and placed immediately behind the anterior border of the tumor; it has a diameter of $1\frac{1}{4}$ cm., and admits only the tip of the pulp of the finger. The second median depression is located $1\frac{1}{2}$ cm. behind the first one, and has a diameter of $\frac{3}{4}$ of a cm. only. The left lateral depression is directed from before backward and from left to right; it has the form of a cleft of less than $\frac{1}{2}$ cm. in width by 1 cm. long; its posterior extremity extends to within 1 cm. of the median line, and to 1 cm. behind the first depression. The right lateral depression is on the same level with the left one, but it is circular and is less than $\frac{1}{2}$ cm. in diameter. The anterior median depression has thus modified the external appearance of the tumor, which is now not regularly globular, but resembles the hilus of a kidney. Placing a constricting band around the head with graduated compresses in the temporal fossæ, the head being erect, and then causing the patient to bend forward, the tumor swelled up as usual, but there were no dilated veins along its circumference, thus excluding a skin origin; and again closing the four osseous

passages by the finger tips, and then inclining the head forward, the tumor expanded with some rapidity, showing that there were other unrecognized communicating orifices in the bone.

January 24, 1858. Tumor now increased in size on its left side, and an examination shows that at this locality a smaller tumor ($1\frac{1}{2}$ cm. in diameter) had formed in connection with it. This, it was easy to distinguish, communicated with the large tumor.

This case of MM. Nélaton and Richard is considered by them of *probably* congenital formation (p. 36), since the tumor was discovered at an early age, and the history presented no evidence of direct traumatism. When it is remembered, however, that the mother of the girl affirms that the growth was not present until after the attack of sickness experienced when her daughter was about 4 or 5 years old,—and had it existed prior to this event it is more than probable the very locality would have revealed its presence; that the patient suffered from a long period of serious illness, and immediately thereafter “a soft spot” in the head was discovered; and, again, that the history is devoid of any direct traumatism whatever, is regarded as quite sufficient to doubt, at least, the congenital origin of the growth, and to warrant the place which I have given it in this group of so-called spontaneous cases.

To this division also belongs the case of Dr. C. H. Mastin, which is described in the first pages of this article.

CLASS III. CASES RESULTING FROM DIRECT TRAUMATISMS.

(1) *Case of Azam.*¹ C—, age 22; miller; robust; entered the Hôpital Saint-André, service of M. Hirigoyen, November 11, 1850. Situated on the top of the frontal region, a little to the right of the median line, was a tumor of the dimensions of a large nut. This was irregularly round, manifest fluctuation, but no discoloration of the skin. Gentle pressure with the palm of the hand reduces it completely in two or three minutes, after which the skin remains empty and flaccid, and is, also, very thin and soft. Hence one can easily recognize an irregularly circular depression across it with salient and unequal edges. The patient reduces it easily himself, and it disappears when the head is thrown backwards and reappears with the forward inclination. The forward posture can not be maintained for any length of time on account of vertigo which accompanies this position. No bruit or pulsation, but seems a little more tense during the respiratory movements. I have thought that I perceived an obscure blowing sound in the tract of the superior longitudinal sinus when the tumor was rapidly reduced by the patient, but my confrères could not verify it. No pain in or about the tumor, and were it not for the deformity, with the vertigo whilst bending forward, he would not be inconvenienced in the slightest by its presence. As to its origin he reported that, at 15 years old he was kicked by a horse in the frontal region. Did not lose consciousness, and even con-

¹ Dupont, op. cit., p. 20; also *Gazette Médicale*, p. 411, 1854; *L'Union Médicale*, 1858, p. 49; and *Gazette des hôpitaux*, 14 Janvier, 1858.

tinued to follow his occupation,—it being only several days thereafter that he discovered this tumor, which has always presented its present appearance. He had consulted another physician some time previously, who made an exploratory puncture, which was followed by a jet of blood. This, however, was easily arrested.

Nov. 20th. M. Hirigoyen punctured it with a lancet. As on the first occasion blood spirted out, having all the characters of venous blood. A probe introduced through the opening discovered a depression in the bone and some roughnesses, although the bone is not denuded but covered by a thin, soft membrane. No orifice of communication with the interior of the skull is discoverable, but this communication must exist, as the large quantity of hemorrhage could have originated only from some considerable source—probably the superior longitudinal sinus. Hemorrhage was easily controlled, and skin wound healed rapidly under simple protection by a bandage. Pressure over the tumor was employed for twenty days without result, and patient left the hospital in an unchanged condition.

C— was presented to the Society of Medicine November 27, 1854, by our colleague Dr. Dupuy; and I saw him yet again three years afterwards, still finding the tumor unchanged.

The avoidance of any operation and the use of local pressure was advised.

(2) *Case of Azam.*¹ Jeanne T—, of the *Bourg-sur-Gironde*, age 60 years, consulted the "charity committee" of the Medical Society of Bordeaux in March, 1854, about a tumor situated in the frontal region. She stated that about eighteen months previously, whilst at work in the field, she stepped upon a rake, which flying up, the end of the handle struck her with considerable force on the forehead. The pain was intense, but she did not lose consciousness. The apparent contusion was relieved by ordinary measures without the attention of a physician. Twenty to twenty-five days afterwards she recognized the existence of a tumor at the point of contusion. This was soft, of the size of a small nut, and hardened and increased in volume when she lowered her head. No headache. Light pressure caused the disappearance of the swelling. Experiencing no pain, she did not consult a physician until after three months had elapsed, at which time the skin covering the tumor becoming thinned and of a violet color, she consulted M. Gaignerat, of Bourg, who punctured it; and, according to her statement, it bled most profusely. However, a bit of English taffeta sufficed to staunch it. She presented herself now at the Medical Society. At this time the tumor, situated on the median (frontal) line, near the root of the hair, was about the size of the half of an ordinary nut; soft and fluctuating; slightly violaceous in color; without either pulsation or bruit; and conveying to the fingers the sensation of a pouch (the skin) containing a spongy substance. It becomes tense when the head is bowed down or lowered, and a continuance of this position causes dizziness. It softens and slowly diminishes under pressure by the hand or fingers. It is very evident that the fluid passes into the skull. After reduction of the tumor there remains under the skin a soft tissue which prevents any close examination of the underlying bone. Taking her to my office for a closer and more careful examination, and making her bend her head forward so as to render the tumor tense, I punctured it with a small trocar. Only a small quantity of venous blood escaped. Manipulating the canula in different directions, I recognized that the tumor was formed not of a single pouch, but of a spongy tissue composed of large cells. This explained the slowness with which the fluid trickled out, and which, also, evidently passed through a narrow passage in the bone

¹ Loc. cit.

into the skull cavity. I could not discover this opening, nor did I recognize any rugosities or denudation of the bone.

(3) *Case of Percivall Pott.*¹ A boy, eight years of age, son of a Jew merchant, of this city, received a blow on his head with a stick. This made him giddy for a few minutes, but there was no bleeding, no external wound, and but little pain, and he concealed the fact of there being a swelling over that portion of his head until it was discovered by his barber. In the middle of the top of his head was a tumor, about the size of a walnut; was indolent, had a dull kind of pulsation, and palpably contained fluid. In the presence of Serjeant Amyand and Mr. Shipton the tumor was divided with a knife, and a quantity of blood discharged; but when the swelling was emptied it was found that the blood continued to flow, plainly not from the scalp wound, but from the bottom of the cavity. Examination now showed that the sagittal suture was fractured, and that a portion of the displaced fragment of bone was forced into the sinus, and by the sides of which the blood issued forth. Attempts to extract this fragment failed. By the advice of the consultants, a small perforation was made on one side of the suture, but through this the point of the elevator could not be introduced so as to remove the broken piece, and so the trephine was applied on the other side of the suture, but with a like result. At last it was decided to risk the hazard of wounding the sinus (which was, indeed, already wounded by the broken bone), and enclose the suture within the circle of the trephine. This was done, but the button of bone came away in pieces, and left the original perforating fragment still piercing the sinus. This fragment being withdrawn by means of forceps, a flux of blood followed, but a dossil of dry lint controlled it. The patient recovered.²

(4) *Case of Hutin (occurring in the service of M. Hutin, at l'hôpital des Invalides.) Reported by Dr. Gustave Dufour.*³

Achille — Maximilien, Marquis de W —, Comte d'I —, born 1770, at Paris; entered infantry service in 1792. In 1799, in charging a redoubt in the Piedmont, he

¹ *Chirurgical Works*, first Amer. from last London ed., vol. i., p. 132; Phila., 1819: also French edition, t. i., p. 151; Obs. 27, 1760: also Dupont, op. cit., p. 14.

² *Note.*—Very similar to this case of Pott are the following:

A dragoon, receiving a wound of the trunk, fell from his horse, striking the summit of his head. He soon became comatose, and, when examined, a swelling of the scalp was discovered at the vertex, the point of injury. This being incised, a separation of the edges of the sagittal suture was discovered, and from which blood was seen to flow. Two buttons of bone were removed by the trephine on the twelfth day, to permit the ready exit of blood effused from a tear in the wall of the superior longitudinal sinus. The symptoms now rapidly subsided, and recovery followed. (*Vide* Guthrie, *Commentaries on Surgery, etc.*, p. 349, Amer. ed.: *Internat. Encyclopedia of Surgery*, Ashhurst, art. "Injuries of blood-vessels," vol. iii., p. 208, 1883.)

A parallel case is one mentioned by M. Mouton (*Memoirs of the Royal Acad. Surgery of France, Sydenham Soc. Transactions*, p. 8; also *Internat. Encyclopedia of Surgery*, Ashhurst, art. "Injuries of blood-vessels," vol. iii., p. 208, 1883), where trephining was practiced on a man, eleven days after a fall, in whom death was imminent from blood-extravasation coming from the superior longitudinal sinus, wounded by a separation of the edges of the sagittal suture. This operation furnished free vent, resulting in immediate cessation of the threatening symptoms.

Had it not been for symptoms of compression demanding speedy operative interference, these cases would have resulted, undoubtedly, in the variety of venous tumor which is the subject of this paper.

³ G. Dufour, *Comptes rendus et Mémoires de la Société de biologie*, t. iii., p. 155; 1851; Dupont, Op. cit., p. 10.

received a blow from the butt end of a musket, in the hands of an Austrian, on right side of forehead about 3 cm. from median line. Stunned by the stroke, he was carried from the battle field, and remained unconscious for twenty-four hours. When he regained his senses perfectly, he was informed by the surgeon in attendance that there was a fracture of the skull, and the lesion was very grave. There was no wound of the integument, but a deep depression under the skin was quite perceptible to the touch. During almost the entire period of the next year he was an inmate of different hospitals, and received divers forms of treatment, especially pressure to the seat of injury. The ultimate result of the wound was an infirmity which incapacitated him from following the profession of arms. When he leaned forward with the head inclined towards the ground, he would feel a swelling form on the site of the wound, having the volume of a nut, of a violet color, and which would disappear spontaneously when he again assumed the upright position. In 1814 he gained admission to the Hôpital des Invalides, and in 1847 M. Hutin, then becoming surgeon in chief, was peculiarly interested in his case; and ordering his history carefully recorded, he himself made the following notes: "Cicatrix not apparent; osseous depression very marked. The condition is, doubtless, the result of absorption of the diploë and the approximation of the two tables of the frontal bone. The pouch is small, formed at the expense of the skin, and is not apparent when the soldier is standing, sitting, or reclining on his back; but when he bends forward with the head lowered, the pouch makes its appearance and attains the volume of half an egg. It is livid in color; is formed, evidently, as are cysts in contused parts; and is dependent on a communication with the superior longitudinal or some other sinus."

I learned that this old man, notwithstanding his age of 81 years, was in perfect mental and physical health, with the full possession of all his senses and faculties, and of a lively disposition. He did not wear the silver plate which had been given him to protect the injured region, and easily and readily reduced this singular variety of hernia with his own hand.

October 28th, 1851. Seized with erysipelas of neck and upper part of thorax, complicated with chronic bronchitis, and died November 3d.

Necropsy, November 5th, thirty-six hours after death. *Thorax*—Double pleural adhesions, but no organic pulmonary disease. Heart hypertrophied, but otherwise normal. Aorta infiltrated with cartilaginous patches, appreciably dilated, and filled by an enormous fibrinous clot, which also extends into the carotids. *Head*—No visible traces of the erysipelatous action. Normal in size and contour. On the forehead, 2 cm. below hair margin, and to right of median line, is seen a cutaneous space about 2 cm. in diameter, which is rendered distinct from surrounding skin by its rosy color; and this corresponds to a clearly outlined osseous depression beneath. Lowering the head of the cadaver fails to produce the phenomenon which was so easily brought about during life in that part of the skull. *Brain*—Sound and without traces of old or recent apoplectic spots; white and gray substances distinct; the vascular network of the pia mater is moderately injected, but without infiltration, and is easily separated and detached from the cerebral convolutions—even directly under the external wound. The visceral layer of the arachnoid, however, on the right side, 3 cm. from the middle line, is glued down to its parietal layer and also adherent to the dura mater, and any traction exerted upon these adhesions causes a few drops of blood to ooze out into its (arachnoid) cavity. The dura mater is, also, easily separated from the entire surface of the bone except at this locality of 3 cm. from the median line, where it is adherent to the osseous wall. Opposite to this attachment, the bone is perforated by several small openings. Injection of water

and insufflation of air into the superior longitudinal sinus demonstrates the existence of a pathological communication (through the bone) of the sinus with the blood pouch above. The caliber of the superior longitudinal sinus somewhat increased, and filled by a long, reddish, fibrinous clot. Skin over tumor thinned, and sends out from its inner fibro-muscular surface attenuated fibrinous prolongations (trabecules, filaments, etc.) which attach themselves circularly to the periosteum on the circumference of the bone depression; and which depression is lined by a bit of cellular periosteum, and is 5 cm. in breadth by $2\frac{1}{2}$ cm. in height. The circumference of the depression is formed by a notable thickness of compact bone tissue, but its center is very thin and spongy. The floor of the depression is also divided, by a jutting out of compact structure, into two smaller depressions: the left one extends a little beyond the middle line of the forehead, is rugose, and is sprinkled with little dark openings; the other on the right side is more extensive, and is riddled with minute apertures—entirely deprived of its vascular element (diploë), and corresponds to the thinnest portion of the cutaneous cavity, at which point both the skin and bone are translucent, so to speak. The frontal suture plainly seen above and below the osseous lesion, but especially apparent on the altered surface. Finally, the tegumentary covering was thinned, being deprived of all muscular and adipose tissue, and composed only of skin re-enforced by a delicate lining of fibrous tissue.

(5) *Case of Hutin.*¹ K—, born in 1771; entered military service in 1790; received, October 14, 1806, at the battle of Jéna, two saber wounds on the head,—the first on superior and middle of forehead, the second on the top of the head. Did not lose consciousness; fragments of bone extracted; recovery after about 9 or 10 months, without any grave symptoms. Forty years passed without his being troubled by any serious sickness, only he suffered from severe headaches. In March, 1846, whilst intoxicated, he fell into a bed of rocks, fracturing thigh and ribs. A pleuro-pneumonia was not tardy in developing; and in ten days thereafter he was also attacked with erysipelas, which was epidemic in the wards. Delirium; parotid abscess.

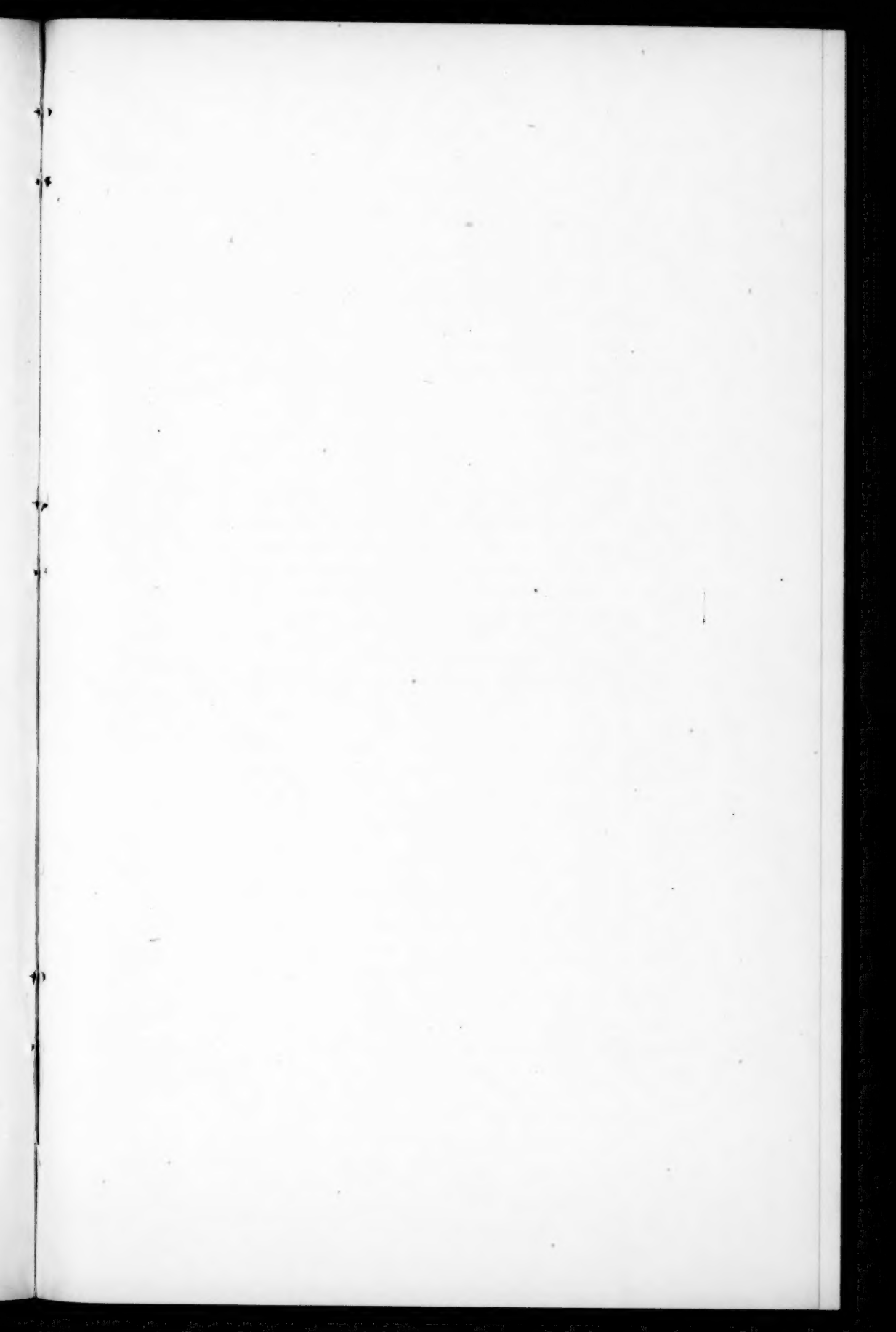
March 24th. Carries hand frequently towards summit of head to the right side of the most prominent cicatrix. Pressure here discloses circumscribed fluctuation and pain, which did not exist previously. Believing the existence of an abscess, a small incision was made into it, but only blood escaped. There was a blood pouch containing a black, semi-coagulable liquid, poured out between the osseous vault and the pericranium, thus detaching the latter. Attempts to detect a fissure failed. The day following the dressings were soaked with about 150 grammes of blood. Attempts to find a fissure still futile. Extended the incision, which brought to view a slow, continuous oozing of venous blood from the depths of the bony wall, and to the inner side of the wound. This was without pulsation, and uninfluenced by the respiration. A delicate blunt probe pressed upon this point readily passed on into the skull through a small opening which was covered over to about three-quarters of its extent by the soft tissues. Dry charpie and a bandage arrested the hemorrhage. Dressing removed third day. Pleuro-pneumonia proved fatal April 7th.

Autopsy. Head—Scalp puffed up and much injected from erysipelatous inflammation. Cicatrix on frontal bone adherent to the remains of the frontal suture, with marked depression of integuments in this locality. At 2 cm. beyond the fronto-parietal suture and within $1\frac{1}{2}$ cm. of the sagittal, commences the other adhesions

¹ *Mémoires de Médecine Militaire*, t. xiv., p. 232, 2e série; 1854. Dupont, p. 17.

belonging to the anterior region of the *second* cicatrix, and which are equally resisting but of limited extent. None of these adhesions were touched by the knife until after the skull was opened. Below these is the pouch which was incised during life. This pouch (subpericranial) is about 4 cm. in extent from before backwards and 2 cm. from right to left. The skull cap being sawn through, the membranes divided, and the brain raised, all was normal except a trivial injection of the arachnoid, one or two points in the brain, and a small quantity of serum in the ventricles. Dura easily detached over almost the entire vault, except at point corresponding to wound of vertex, and on each side of the closed sagittal suture, where it adhered closely to parietes, but without any visible scar. At a point corresponding to the external angle of wound dura mater intimately united with external tissues through a fissure of right parietal bone. The unclosed opening of the bone was about 2 mm. in width by 1 cm. long. On opening the superior longitudinal sinus it was seen to contain a small quantity of coagulated blood, which was partially dislodged by a stream of water,—after which was visible a very pronounced projection in the sinus, passing in a line from behind forward and from right to left; and corresponding exactly to the external cicatrix. This projection proceeded from the depression of a thick splinter of bone depending from the internal osseous table, and was produced evidently by the saber blow,—being partially detached and thus remaining fixed for many years. This spicula terminated in a spine which had perforated the longitudinal sinus, and passing through into its lumen maintained patulous an opening into its wall of 4 mm. Through this opening a small quantity of blood had escaped from the sinus, and which, poured out between the bone and the dura, formed in this locality an oblong pouch of 3x2 cm. in diameter; but on the outside of the skull it had diffused itself between the bone (right parietal) and the periosteum, forming the collection which had been mistaken and opened for an abscess. This external effusion had passed through an opening existing in the left parietal, 1½ cm. in front of and to the right of the sharp end of the fragment, and resulting from the non-occlusion of that part of the bone divided by the saber blow. The extravasated blood between the dura mater and the skull was coagulated, and sent out a fibrinous clot into the open wound in the wall of the sinus. Another clot completely filled the osseous wound. Hence there was a direct communication between the superior longitudinal sinus and the wound in the integuments, for in this fracture there were no adhesions between the meninges and the pericranium as existed through the anterior fracture. By raising up the superior longitudinal sinus the perforated portion was displaced, and is thus seen to be a little to the right of the median line.

[To be continued.]



NOTICE TO READERS.

A careful classification of the matter in the department of *Index of Surgical Progress* will hereafter be observed, under the following heads :

- I. General Surgery.
- II. Operative Surgery, Surgical Anatomy, Surgical Instruments and Appliances.
- III. Head and Neck.
- IV. Chest and Abdomen.
- V. Extremities.
- VI. Genito-Urinary Organs.
- VII. Wounds. Injuries. Accidents.
- VIII. Ulcers. Abscesses. Tumors.
- IX. Bones. Joints. Orthopedic.
- X. Gynæcological.

In this department will be included, also, the contributions appearing heretofore as Proceedings of Societies, and the special department for such proceedings will be omitted. The single department of Index of Surgical Progress will thus become a *complete and comprehensive classified digest* of all important current contributions to surgical knowledge and practice, gathered from every source.

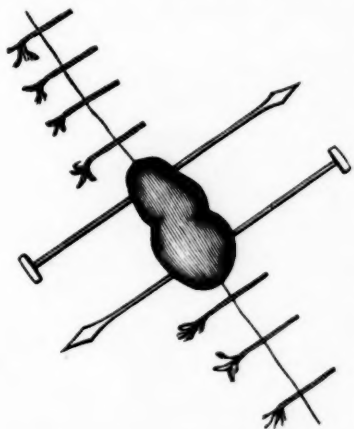
ON THE USE OF HARE-LIP PINS FOR FIXING THE STOMACH IN GASTROSTOMY.

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SURGEON TO THE WESTMINSTER HOSPITAL.

THIS method is first incidentally referred to in the report of a case published in the *Lancet* of August 2, 1884. A detailed description of it is as follows:

The stomach having been found, a fold of it is seized and drawn through the external wound with a pair of dressing forceps, whose teeth are covered with pieces of indiarubber drainage tubing slipped over them. The assistant holds the forceps while the operator transfixes the projecting fold of stomach with two pins, placed parallel to each other, and about three-fourths of an inch apart. (See the diagram).



These pins transfix the stomach *only*, not the skin. No sutures whatever are placed in the stomach. But the lips of the operation wound in the abdominal wall are closed with sutures which bring the peritoneal surfaces together. Of course an aperture is left where the piece of stomach projects. If the patient's condition is such as to require feeding by the stomach an opening is made into it on the third day after the operation; the opening is only just large enough to permit of a soft No. 7 catheter being in-

serted into the stomach for feeding purposes. Eventually a rubber tracheotomy tube is substituted for this.

In my first operation a wire suture was placed through the stomach to keep the protruding piece of it pinned against the thorax, but I came to the conclusion that this proceeding served no useful purpose and was a superfluous addition to the hare-lip pins.

The advantages of this method of proceeding are:

1. The absolute security of the method of fixing the stomach.

2. The speed and ease with which it is done. In this respect a very favorable comparison can be made with the plan of using numerous peritoneal sutures.

In the three cases of gastrostomy performed in this manner up to the present time, the results, from a surgical point of view, have been perfectly satisfactory, the stomach adhering to the abdominal walls in about a week, the patient's temperature not having risen beyond the usual point.

A SUCCESSFUL CASE OF GASTROSTOMY FOR APHAGIA DUE TO MALIGNANT DISEASE OF THE PHARYNX AND FAUCES.

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ALTHOUGH gastrostomy has now attained the rank of a recognized operation in surgery, and bids fair to advance to the same favor that colotomy has acquired, yet every case, successful or the reverse, ought to be duly chronicled in order that its merits or demerits may go, after careful criticism, to increase or decrease the popularity of the operation, and that the dangers and difficulties encountered in each case may incite to the adoption of improved methods for its performance.

E. S., æt 64, came under my notice in August, 1883, complaining of slight pain on mastication. Three months previously he had noticed a pea-sized swelling on the right side of the frænum linguæ. This had gradually increased in size. There was an obscure history of slight injury to that spot some time previous to the appearance of the growth. He had been in the habit of smoking a good deal, and had always used a clay pipe. No family history of carcinoma was obtainable. The patient looked healthy, well nourished and young for his age. A warty epitheliomatous growth was seen to extend along the right side of the floor of the mouth, almost from the frænum to the anterior pillar of the fauces. The tongue was not involved, nor were its movements limited. No enlarged glands could be felt. On September 7th I freely excised the growth with the galvanic ecraseur, and he left the hospital in a couple

of weeks with only a slight scar at site of operation. In January, 1884, he was readmitted with recurrence of the growth. A hard warty growth could now be felt at the base of the tongue, involving the right pillar of the fauces and stretching into the soft palate. Two small glands, hard but moveable, were discovered at the angle of the jaw on the right side. In consultation it was advised to allow the growth to take its course, and the patient was accordingly discharged. In the beginning of September, 1884 (a year after the first operation), the patient came to me with tears in his eyes, begging for relief. He stated that he had not swallowed solid food for four months; that latterly he had "suffered a martyrdom from swallowing even his spittle," and that he was now afraid to sleep for fear of being choked. He was greatly emaciated. The right side of his face and neck was somewhat swollen and hard. It was found that the tongue was deeply involved at its root, being fixed to the hyoid bone, and that the pharynx, palate and fauces were so implicated that the œsophageal and laryngeal openings were almost occluded. He placed himself, without reserve, in my hands, and on September 18, 1884, I performed gastrostomy. Chloroform having been administered, I passed a small œsophageal tube past the growth into the stomach, and fitted the nozzle of a Higginson's enema syringe into it. After carefully covering the inlet of the syringe with lint dipped in carbolic acid, 1 in 20, I pumped a quantity of air into the stomach. Immediately the outline of the stomach became plainly visible on the sunken belly. The liver was then carefully percussed and marked out and the lower edge of the stomach defined. An incision a little over two inches long was now made parallel with, and at a finger's breadth from the lower margin of the left ninth costal cartilage, the entire incision being situated over the rectus muscle, which was then exposed on dividing its sheath. The margins of the sheath were then held apart with retractors and the longitudinally disposed fibres of that muscle gently separated with the handle of the knife, left thus to serve afterwards as a sphincter to the opening in the stomach. The posterior layer of the sheath, subperitoneal tissue and peritoneum were then divided vertically, and in direction of the fibres of the rectus for about three-fourths of an inch, and into this opening the extreme border of the left lobe of the liver immediately projected. This was carefully pushed to the left by means of a finger duly carbolized, and its place was taken by a small patch of stomach. The finger was again inserted and the stomach gently pressed downwards until a spot was supposed to have been reached midway between the greater and lesser curvatures, and the cardiac and pyloric portions—a manipulation theoretically easy but practically difficult through a small opening. Two stout

silk ligatures were now passed through the edges of the wound, embracing all its component parts, and made to traverse the entire thickness of the presenting area of the stomach, the ends of both ligatures were knotted and slipped over the dresser's finger, and slight traction made upon them. While the stomach was thus kept in apposition with the abdominal wall, a ring of sutures of finer silk was inserted along the circumference of the included area. These sutures passed through both stomach and abdominal wall. Two sutures now brought the upper and lower lips of the wound together. The tension of the finger on the looped sutures was now released and a thumb-nail sized piece of stomach bordered by the red margins of the incisions was seen to be well supported and in perfect apposition with the abdominal wall. Lint dipped in carbolic oil (1 in 8) was now placed in layers over the wound, and over this dressing a small finger bandage wrapped in wool was arranged, so that its long axis coincided with the incision. The looped ligatures were now united and retied firmly over the roller, so that pressure was brought to bear upon the stomach both from within and from without. Morphia subcutaneously gr. $\frac{1}{8}$ was administered. Patient had a fair night; there was no vomiting though slight retching occurred. Nothing was allowed by the mouth, not even ice. His pain, which was at times severe, was subdued as far as possible with morphia, and nutrient enemata administered. The next day he complained so bitterly of thirst that he was allowed a little iced milk. On the third day the operation was completed. On removing the dressings the stomach was found to have retracted, and to have drawn in the abdominal wall. A transverse incision was made into the stomach with scissors the looped ligatures pulled out with a button hook retractor, divided, and the ends tied as in colotomy. A catheter with a funnel attached was passed in and brandy, $\frac{3}{4}$ ss.; peptonized beef tea, $\frac{3}{4}$ iv poured in. A pledget of wool twisted into a conical plug was inserted and the surface of the part freely dusted with starch. From this day he did well. We found that after a little time deglutition had to some extent returned, and he was allowed to keep his throat and mouth cool by swallowing iced milk in small quantities. Soon solid food (chopped beefsteak) was passed into the stomach, and he was able to get up and sit in a chair. His weight increased; markedly so at first. There was some considerable difficulty experienced in preventing the contents of the stomach issuing from the wound, and several slight attacks of inflammation of the surrounding skin ensued. Various appliances were tried, but until the wound healed and a boxwood canula and plug was inserted nothing served so well as a conical twist of lint pressed into the opening and supported there by strapping. With fluctuations both as re-

gards pain, weight and general condition, December was reached in comparative comfort. In the first week of this month the growth increased rapidly, extending, however, outwards, ultimately breaking down, and fungating under the jaw on the right side. Internally it made some progress, as was evidenced by the altered breathing and frequent attacks of dyspnoea, but not to any great extent. At the date of this report (Jan. 1, 1885) the patient is failing and tracheotomy is imminent.

Inflation of the stomach, when practicable, is of great value in bringing this viscus immediately within reach of the finger. It does away with large incisions and much meddling with the viscera; moreover, it keeps the stomach in apposition with the abdominal wall during the necessary manipulation. If the accumulation should afterwards, as it did in the above case, prove uncomfortable, or even oppressive to the patient, it can be removed by means of the œsophageal tube. The operation of opening the stomach in cases of aphagia from malignant disease in the upper part of the pharynx is not a common one, but the advantage derived therefrom is undeniable. The patient in the above case was saved from the painful death of starvation, and directly the irritation from the enforced attempts at deglutition was removed the growth stretched in a different direction, extending below the jaw and making comparatively but little progress about the larynx.

SUCCESSFUL NEURECTOMY OF INFRAORBITAL
BRANCH OF FIFTH NERVE, AT LEVEL OF
FORAMEN ROTUNDUM, FOR RELIEF OF
RECURRING TROPHIC DISTURBANCES
AND INVETERATE
NEURALGIA.

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SURGEON TO ST. JOHN'S AND ST. MARY'S HOSPITALS.

THE following case, besides the fact that it required for its final relief one of the rarer neurectomies, possesses points of clinical interest which, it seems to me, render it worthy of publication.

Frederica W., a bright intelligent girl of sixteen, who had been born blind, but had otherwise been in perfect health, presented herself to me at St. Mary's Hospital on June 16, 1883, with the following history:

Six months previously she had noticed a painful swelling at the outer angle of the left eye which did not involve the lid, but becoming painful, was opened by a physician and disappeared in about a week. Two weeks after a similar tumor appeared at the outer angle of the right eye; this extending inward soon involved the lower lid, and to a slight degree the upper one. In a short time this also disappeared (without surgical interference), but after a few days returned, and again vanished in less than twenty-four hours. A similar tumor also appeared behind the right ear; this was opened and discharged freely, closing up and healing rapidly. From that time to the date of admission she had never been wholly free from the presence of one or more of these swellings on some portion of her face, leaving one spot only to reappear in another. All had been painful, with a decided tendency to nocturnal exacerbations, and accompanied by pain in the eyes and middle ear of the affected side, and severe frontal headache, which she had never before had. The pain and loss of sleep had so affected her general health that her appetite was completely lost, and she had become pale and anaemic. The bowels were perfectly regular, and her menses, though normal as to time, had been steadily diminishing in quantity and color. She also complained of constant orbital pain, and inability to sleep on that account.

The swelling which was present at my first examination resembled very strongly a patch of erythema nodosum, as usually seen on the anterior aspect of the leg.

The patient's description of the stages through which she had been told the former swellings passed, also confirmed me in my opinion that her disease was of nervous origin. According to her (and further study of the case confirmed her statement), the tissues first became red and swelled rapidly, and then changed to a greenish yellow, gradually fading away like an ordinary bruise; a severe burning, lancinating pain accompanied its progress. The process was just terminating in the swelling described above, and the yellowish-green stain and swollen condition of the surrounding parts still remained. An exploratory puncture was made, but with no result. The left eye, just above the swelling, was with difficulty examined, owing to the infiltration of its lids, but showed, on exposure, a sub-conjunctival extravasation of blood. The patient was at once put upon a liberal diet with ferruginous tonics, stimulants, etc., and lead and opium wash externally. Under this treatment her general condition was gradually improved, and in a few

days the swelling had markedly diminished, though the staining of the skin remained for a few days longer.

Her sleep, however, was during this time interfered with by a severe occipital headache, which was accompanied by nocturnal rises of temperature, varying from $102\frac{1}{2}^{\circ}$ to $103\frac{1}{2}^{\circ}$ Fahr. No cause for this could be discovered, as her respiratory, renal and alimentary organs were free from disease. Under large evening doses of quinine the temperature gradually fell to the normal standard, and remained so with few exceptions during the remainder of her illness. Sleep, however, could be only obtained by large doses of morphia and atropia given hypodermically.

On the morning of July 13, blood was found exuding from a pin-hole opening in a swelling which had existed for a few days past under her right eye; this fact, together with the strong resemblance which the swelling had borne to an ordinary contusion, made me suspect that possibly we were dealing with a simple case of hysteria and simulated pain, etc. The patient was therefore put under a strict surveillance, unknown to her, and for days the sisters in charge of her case kept an hourly watch over her, with the result only of assuring us that whatever else might be the case her pain was genuine and severe, and the swellings spontaneous in their origin.

By July 24 the pain was somewhat abated, but the swelling increased, and on the 29th the sense of fluctuation was so distinct that I aspirated it, but with no result. On the following day the pain had returned and I made an incision to the bone, thinking that possibly an accumulation under the periosteum might be found.

This incision gave some relief, and by aid of poultices the tumor rapidly diminished in size, exuding for a few days a thin serous fluid, and then going through the ordinary changes of color, etc.

On August 3 it had almost disappeared, but on this day a precisely similar swelling made its appearance *in the same location on the opposite side of the face*; severe pain accompanied its presence, but this was relieved by local sedatives, and in a few days the same phenomena of discoloration, etc., were repeated.

On August 9, however, the swelling increased rapidly until the whole lower lid was involved, and the skin almost black from sub-cutaneous extravasation. The pain was exquisite, and accompanied by an internal strabismus of the eye on affected side. The conjunctiva also was suffused, and in a few hours the upper lid began to swell.

August 13 an incision was made by my associate, Dr. George Westbrook, through the periosteum. Nothing was evacuated but blood—the pain remaining about the same. In a few days, however, the strabismus and swelling both disappeared and the pain diminished.

By August 25, however, the tumefaction, which had been steadily diminishing, suddenly increased again, and began to invade the malar and temporal regions.

This condition remained with varying severity until early in September, when another incision was made for relief of tension and exploratory purposes. Nothing was found but a thickened periosteum. Relief of pain followed for about a week, when the swelling and pain returned. The latter symptom was now so decidedly neuralgic in its character, following the distribution of the infra-orbital nerve, that on September 27 I cut down upon the nerve at its exit from the foramen and severed it close to the bone, resecting a portion of the distal leash of branches. The wound was closed with horse-hair sutures, and healed in about a week under antiseptic dressings. The pain, though much relieved, did not wholly disappear for some weeks after.

A severe *dental* neuralgia now developed itself, and, in spite of the use of all ordinary remedies, including croton-chloral, aconite, local applications of various kinds and galvanism, remained persistently until after the subsidence of the phenomena about to be described.

By October 25 the external swelling had again returned and involved the cheek proper, the region of the eye and malar bone being less affected. In a day or two examination revealed thickening of the whole substance of the cheek, the swelling protruding into the cavity of the mouth, and resembling precisely an occlusion of Steno's duct. Such, in fact, I took the inner portion of it to be, and punctured it from within with a large trocar, having first tried repeatedly to introduce a flexible probe by the natural orifice.

This operation, made on October 30, gave exit to nothing but a few drops of bloody serum (as in the case of all former punctures), but was followed by rapid subsidence of the swelling and abatement of the pain, so that by November 7 she was only taking an occasional anodyne, and by Nov. 12 was discharged, free from all swelling and pain and very much improved in her general health.

During the following February the patient returned with a swelling of the right lower lid and the usual pain and discoloration. The pain, however, was not so severe as on former occasions, and hoping that it might be due to some local influence from reparative processes in the wound made in September, or to reflex disturbances from other branches of the nerve, I ordered evaporating and sedative applications, and began the systematic administration of Duquesnel's aconitia. The drug was at first given in does of $\frac{1}{280}$ gr., the daily amount being steadily increased, until by March 24 she was taking $\frac{1}{160}$ gr. three times a day with no apparent effect on the pain, which had been steadily increasing since her admission.

This was continued until, by April 28, she was taking about $\frac{1}{8}$ gr. at a dose of Schiefflin's aconitia pellets, but with no relief from pain. Attempts to push the treatment further than this only produced alarming symptoms, but with no effect on pain.

As all therapeutic resources seemed to have been exhausted, the patient was allowed a few days in which to recover from the depressing effect of the aconitia, and on May 8 was submitted to the following operation. A curved incision was made from the inner canthus of the eye, downwards and outwards over the cheek, and then carried upwards to the outer edge of the orbit. This incision, carried through the soft parts to the bone, gave a flap which, when turned up over the eye, gave ample room for subsequent manipulations. The attachment of the Levator Labii Superioris was cut through, and the periosteum stripped up and reflected with the flap. Hæmorrhage, which was quite free, was now arrested by torsion or catgut ligatures, and the autrum of Highmore opened by a trephine having a cutting edge of $\frac{5}{8}$ inches, the pin of the trephine being applied on a line directly below the infra-orbital foramen, as suggested by Dr. George R. Fowler, and its edge almost touching the inferior wall of the canal.

By this means the second step of the operation, which consists in releasing the nerve from the infra-orbital canal, is much simplified.

The nerve was now secured at its exit from the foramen by a ligature and gently drawn upon, that both it and its accompanying vessels might be lifted as much as possible out of harm's way while the bony floor of the canal was broken down.



FIG. 1. PROBE-POINTED CHISEL.

Having had the pleasure of being present and assisting Dr. Fowler at two operations of this kind, I was impressed with the desirability of having some instrument by which this stage of the operation could be simplified and shortened, since, if a chisel is used, the periosteum is soon torn, the vessels wounded, and a most intractable hæmorrhage sooner or later takes place, which not only hides the parts from view but is absolutely beyond control, as at every successive stroke of the chisel the vessel is opened in a new place, and much time is lost before the nerve is wholly free and the vessel can be finally secured. To avoid this difficulty I had made for me a probe-pointed chisel, as shown in the accompanying cut (fig. 1), the dull beak of which strips up and pushes away the periosteum and vessels while its edge rapidly cuts away or breaks down the thin bony walls against which it is driven.

With this instrument I rapidly and without hæmorrhage broke down the floor of the canal and reached the posterior wall of the antrum.

To this a trephine of $\frac{1}{2}$ inch diameter was applied through the anterior opening and the speno-maxillary fossa opened into. A brisk hæmorrhage at once occurred as the button of bone was removed, but was soon checked by pressure with sponges thrust deep into the cavity. When this had ceased the periosteum lining the infra-orbital canal was divided and the nerve gently depressed and traced back to the speno-maxillary fossa. Here of course it was lost to sight, as it turned inwards to the foramen rotundum, but was easily felt and divided as far back as possible with the scissors devised by Dr. Fowler for this purpose, and shown in fig. 2. But little hæmorrhage occurred, and after waiting



FIG. 2. SCISSORS FOR USE IN SPENO-MAXILLARY FOSSA.

some minutes for its cessation I carefully cleansed the fossa and antrum with a warm carbolized solution, and having dissected out as far as possible all branches of the nerve to be seen in the flap, laid it back in its place and secured it with horse-hair sutures. The wound was dressed with naphthaline sprinkled freely over its surface, and covered with a pad of naphthalinated wood-flour.

The patient had slight pain in the teeth of the upper jaw for a day or two, but it rapidly subsided without opiates, and the dressings and sutures were removed on the seventh day. The wound was healed and the patient about on the 21st of May, and left the hospital free from all pain May 26, just eighteen days after the operation. She has been for the last eight months entirely free from pain, and is now, I understand, in perfect health.

EDITORIAL ARTICLES.

ON THE PRESENT STATE OF TREATMENT OF THYROID TUMORS.

The surgical clinic of Tübingen has had an active part in advancing the treatment of goitrous tumors, on account of the frequency with which this malady occurs in Württemberg. In a recent lecture, which appears in Volkman's Series of Clinical Lectures, Prof. P. Bruns, of Tübingen, reviews the more recent experiences which have accumulated in the treatment of the disease. The special observation and experience of the author himself makes his facts and doctrine worthy of special examination and consideration.

The question whether these tumors are to be operated upon at all is first considered. The inhabitants of that country being quite accustomed to the sight of tumors of the neck, the author does not think the disfigurement caused by them a sufficient cause for their removal; but they are frequently the source of danger,—not so much those larger and deforming pendulous ones, but chiefly the smaller ones, which press upon the trachea, especially when they are situated below the sternum. For dislocation and compression of the trachea, as Rose has pointed out, mechanically impede the performance of the respiratory functions, and consequently cause venous stasis in the vessels of the neck, and gradual dilatation of the right ventricle, followed by atrophy or fatty degeneration, and, in further consequence, bronchiectasis and emphysema of the lungs. Moreover, stenosis of the trachea, produced by compression alone, leads directly to severe dyspnoea and danger of suffocation. Sudden death, furthermore, frequently occurs in thyroid disease, and in an entirely unexpected manner, from acute asphyxia, as well as during and after operations, to which Rose has likewise called attention. Asphyxia associated with paralysis of the heart does, in fact, produce instantaneous death, which even the performance of tracheotomy cannot avert, the operation being moreover exceedingly difficult of execution. Such inci-

dents are to be explained by the sudden occlusion of the trachea through its becoming bent at an angle in consequence of dislocation or movements of the tumor. The author is at variance with Rose, however, in this matter, who explains the occurrence as resulting from atrophy and metamorphosis of the tracheal cartilages into connective tissue, so that the trachea represents only a soft tube,—an explanation which has been universally accepted; the author's experience, based on microscopic investigations, being, that such atrophy is not demonstrable, but that the shape of the trachea having become gradually altered by compression and bending of the tracheal cartilages to the so-called sword-sheath form, the trachea may easily become bent at an angle, or compressed, especially if the lumen at the bend becomes obstructed with loose masses of inspissated mucus. In consequence of all these dangers timely aid is recommended.

Before turning to the operations indicated, the author considers the medicamental treatment, according to the different classes of tumors to be distinguished, the parenchymatous and the cystic ones. Treatment with iodine is of effect only in the former, external and internal use often reducing fresh, "hyperplastic" strumæ in a short time (in which case only, the treatment is to be continued); but generally fails in fibrous, calcified or otherwise degenerated tumors. The same holds good of Lücke's parenchymatous injections of tincture of iodine, which, however, are not free from danger: for beside subsequent suppurative and septic inflammations, sudden death has occurred no less than six times after this procedure. Such rapidly fatal issues are explained by the author not only by embolism, but by some lesion of the vagus nerve of one side producing, through reflex action of the nervous centers, a bilateral paralysis of the nerves of the larynx, either a paralysis of the vocal cords with closing of the glottis, or a paralysis of the dilators of the glottis after Semon; or by some lesion of the recurrent branch; or by some spasm of the adductor muscles on one side, combined with a paralysis of the other side, quite frequent in such tumors.

If, then, iodine is of no avail, the only certain means to be employed is the extirpation of the thyroid body; for all other methods, as ligaturing the thyroid artery, electrolysis, use of caustics, the seton, artificial digestion, are much more uncertain and more dangerous.

Extirpation is indicated when great disturbance is caused, or, if the symptoms of distress are on the increase, on account of the continued growth of the tumor; and also if the occupation is thereby interfered with, as in the case of shoemakers;—but not solely on account of disfigurement, unless the tumor be one easily enucleated.

The question as to the mode of treatment to be adopted in cystic tumors, in which iodine, as has been remarked, has no effect, is next considered. The method most usually chosen is that of tapping with subsequent injection of iodine tincture into the cyst; a treatment which according to Kocher is capable of curing every case. Although the author believes this is saying too much, he proceeds to show how Billroth cured 29 of 35 cases in this manner; and in his own clinic 45 of 74 were completely cured and 11 much improved, making, in all, 75 per cent. Only 17 cases showed no change. But even this method is not altogether free from danger, since two cases of sudden asphyxia are recorded, one terminating fatally. The method, however, is to be recommended, in the opinion of the author, notwithstanding, since it presents a still smaller mortality percentage than that of the other operations, which is 1.76; but it should be restricted to such cases only which show no disorders of innervation of the larynx; moreover, Lugol's solution should be employed, and the fluid injected again allowed to escape. But the method is of no use in multilocular cysts, or when indurations, etc., are present.

A second mode of operating is that by incision; of this, however, the author has no experience, having himself always preferred to extirpate the cyst, this latter operation being more easy and less dangerous in cystic than in parenchymatous tumors, the course of recovery, moreover, after antiseptic incision, being of longer duration than in the other operations.

Lastly, the extirpation of the tumor is considered. The indications are the same as given above. The operation, although 30 years ago considered "foolhardy," has made great progress of late, it having been performed fifty times in Tübingen; the results, too, have been more successful, on account of the improved methods of operating and in the treatment of wounds; they having advanced from 41 per cent. mortality in 1850 to 5.8 per cent. in 1883; the last 21 cases having all completely recovered.

The excision of a non-malignant struma may be considered as almost altogether free from danger. In fact, the immediate effect of a total extirpation of the whole of the thyroid have not been fraught with any greater danger than a partial excision; nor has physiological science hitherto regarded it as dangerous. Now, however, surgery has interposed and interdicted the practice, since Reverdin, Julliard, Kocher, Baumgärtner and others have called attention to a disease brought about by removal of the thyroid body, and called by Kocher "cachexia strumipriva." Of this malady 32 cases have hitherto been observed; its features consist in a typical combination of symptoms.

Beginning from one to six months after operation and having occurred hitherto 11 times in the male and 21 times in the female subject, the disease consists in the gradual development of a cretinoid state. The expression of the features is changed, the whole face is swollen; the eyelids protrude, are baggy, translucent and infiltrated; the lips are thick and pouting; the color of the face is waxy pale and of a peculiar yellowish, sallow hue. The swollen face, the coarse lineaments, the slow and heavy play of the features and decreased mobility of expression give an appearance of idiocy to the patient. The entire body is swollen and fuller than normally; this is especially noticeable in the hands, the fingers of which are plump and restricted in their movements. The skin of the body is dry, desquamating, scaly and thicker, but at the same time peculiarly soft, not pitting upon pressure. Perspiration is arrested. The hair of the head is thin, scant and dry. A sense of exhaustion and heaviness in the limbs, numbness and sensation of cold in the arms and legs is felt. Dexterity and skill decreases, so that fine work is no longer possible; although the muscles retain their power and are not atrophied, the actions of the body are weak and the movements labored and awkward. Speech is slow, the tongue is swollen, as also are the tonsils and the palate. Mental activity is impaired; perception and recollection is slower. The patient becomes taciturn, silent, and indifferent. In children decrease of mental ability can be noticed. The organs of sensation, however, with those of special sense, are only impaired in function, in the most severe cases. Internal organs show no change; there is no tumor of the spleen, no nephritis. Anæmia prevails, characterized by oligocythæmia, the num-

ber of red blood-corpuscles being diminished to half; but no other change is noticed.

After this description of the disease the author, who has himself observed three such cases, and who was enabled to have one present during the lecture, turns to consider the various hypotheses invented to explain the occurrence of the symptoms. He points out that this state is quite independent of the character of the tumor; nor does it show any similarity with the cachexy produced by iodine; it obtains only after removal of the entire thyroid organ, and not after partial excision or in cases where a recurrence of the disease manifests itself. He therefore concludes that the organ possesses some specific function, performance of which is necessary to complete health.

He remarks that our present knowledge of the function of the thyroid gland being restricted to the fact that it is in some way connected with the blood, though not very extensive, explains its function in the most simple manner. Yet it can not act in an analogous manner to the spleen, as leukæmia has never been observed in these cases, and therefore Dr. Crede's supposition that the spleen and the thyroid may vicariously perform the functions of the other, can not be correct. The thyroid appears only to influence the composition of the blood or the relative amount of substances constituting it, either by destroying deleterious substances, or by producing substances indispensable to the nervous system; and the fact that the disease does not become established for months, speaks for the latter theory. A peculiar alteration of the nervous centers sufficiently explains all the symptoms.

After advancing this theory the author criticises others already previously put forth. Liebermeister and Schiff believe that the thyroid gland regulates the circulation of blood in the brain; this hypothesis is weakened by the gradual and late appearance of the symptoms and the progressive character of the malady; whereas, on the contrary, a gradual equalization would have to have been observed to be in keeping with this theory.

Kocher explains the swelling of the face, and the mental symptoms, as being due to circulatory disorders in the region of the head; and is consequently forced to find another explanation for the other symptoms, which he does by stating that they are caused by progressive

anæmia, or hydræmia, as remote consequences of the operation, and occasioned in their turn by atrophy of the trachea, due to the ligaturing of the thyroid artery, and, consequently, to deficient respiration and supply of oxygen. And Baumgärtner considers the narrowing of the air-passages, in consequence of disorders of innervation of the vocal cords, as occasioning the disease.

But, the author replies, other patients suffering for years from stenosis of the larynx never show any such symptoms as those under consideration; moreover, the patients which the author has examined certainly do not present nervous disorders or stenosis of the larynx.

In answer to Kocher's statement, that hydræmia is unquestionably the reigning feature of the disease, the author points out that there was no alteration found in the blood (of Kocher's case) causing it to differ from the normal state, while all the other symptoms were well marked.

On the other hand the facts, that only total removal of the whole organ causes the disease, and that the remaining parts show considerable increase in dimensions after the lapse of years, are favorable to the author's theory.

The author next turns his attention to the physiological experiments, and narrates how Zesas found that dogs and cats easily stood the operation, but that the blood showed an increase in the number of white blood-corpuscles after the lapse of weeks; that loss of appetite, general weakness, unsteadiness of gait, convulsions, paralysis and death followed, and the post mortem showed cerebral anæmia and tumor of the spleen; from which facts Zesas concluded that the organ served to make the blood, and could be substituted by the spleen; but that it also, in addition to this, regulated the circulation in the brain, which function could not be vicariously performed by the spleen.

Schiff found that lesions of the recurrent branches of the vagus, and of the sympathetic nerve, as well as the dissecting around the gland, did not cause death, but that the extirpation ended fatally after 4 to 27 days; he is of opinion that the gland plays some important part in the nutrition of the central nervous system,—although nothing was found here.

J. Wagner found that all cats upon which he experimented died

within 11 days after the removal of the thyroid, with nervous symptoms, and believes that death is caused by the accumulation of some substance deleterious to the nervous system.

The author finally calls attention to the remarkable similarity existing between these cases and a disease which has created much interest of late, which is identical with Gull's cretinoid state, Ord's myxœdema, Charcot's myxoderma and cachexie pachydermique,—the decrease in size of the thyroid gland being mentioned as a symptom of the disease.

Hoping that the future may throw some light on the physiological aspect of this subject and may elucidate the connection between cretinism and thyroid tumors, the author finally alludes to the important practical lesson to be drawn from these experiences: never to extirpate the gland in toto, but only to perform excision, when a part of the gland can be left behind.

W. VAN ARSDALE.

PNEUMOTOMY.

De la Pneumotomie, par Dr. Cartaz, *Gazette Medicale de Paris*, Nos. 43 and 44, 1884.

Under the caption—Pneumotomy—Cartaz discusses the operation of opening and draining pulmonary cavities, reserving the name of pneumectomy for that of excision of a part of the lungs. The article opens with a short historical review of the procedure, commencing with the early references to it to be found in the writings of Baglivi, Barry, Pouteau, and especially Richter. Krimer, in 1830, was the first who deliberately opened a pulmonary abscess, using a cautery and a bistoury. He was followed in 1814 by Hartings and Stockes, who opened an apex phthisical cavity with fair success. Brichteau operated twice without much success. In 1873 the operation was revived by Mosler, of Griefswäld, and Pepper, of Philadelphia, who punctured pulmonary cavities and injected various disinfectant fluids into the lungs, and Mosler freely opened and drained a cavity, but the patient died three months later. In 1877, C. T. Williams opened a large basic cavity, and for a time his patient was greatly benefited. Since then the cases and operators have been more numerous.

Cartaz, like other writers, divides the cases for which the operation may be undertaken into three groups, and he discusses its value in each separately.

1. PULMONARY CAVITIES IN PHTHISICAL PATIENTS.—These afford about three-fourths of recorded cases. In no case has a cure been obtained, and the only improvement gained by the operation has been a lessening of cough, expectoration and fever. On the other hand, the operation has caused serious hæmoptysis, and the relief obtained can be secured by medical means. Further, it has been found very difficult to localize the cavities so precisely that they can be readily opened by the surgeon, and for these reasons and the fact that the operation affords no hope of actually curing the patient, Cartaz is of opinion that it should be entirely abandoned.

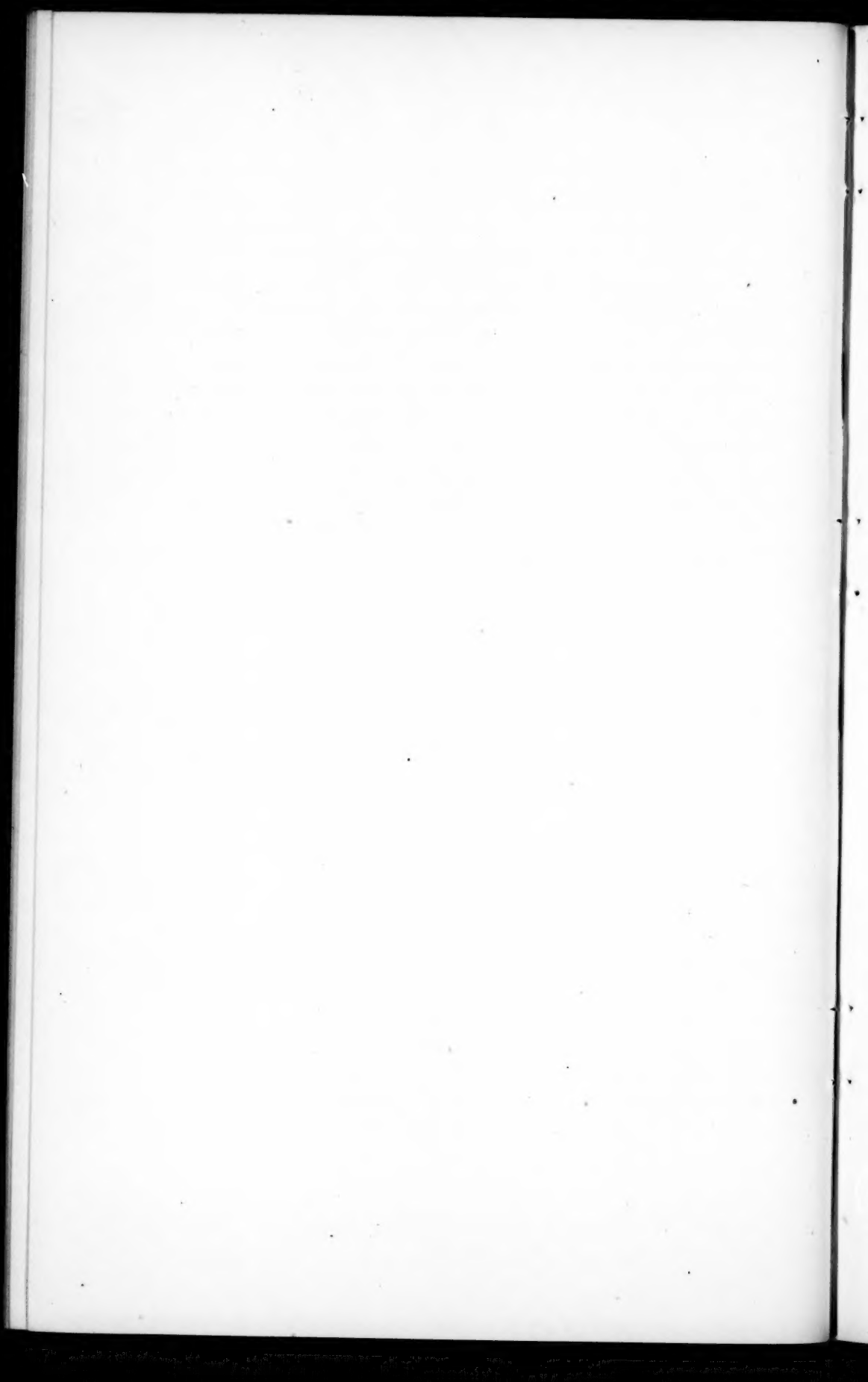
2. BRONCHIECTASIS IN NON-TUBERCULAR PATIENTS, this diagnosis being established by the absence of bacilli in the sputum. The case recorded by Lauenstein (*Centr. f. Chir.*, No. 18, 1884), is the only one in which a permanent cure has been obtained, and having regard to the fact that the bronchial dilatations are but rarely single, and that therefore the operation can not be curative, Cartaz rejects it in this group of cases also.

3. LOCALIZED PURULENT AND PUTRID COLLECTIONS whether due to suppuration—simple or traumatic—gangrene, or suppuration of hydatid cysts. There have been already recorded seven cases of complete recovery when the operation has been done for these conditions. G. Lawson was the first surgeon thus to treat gangrene of the lung; his patient died; then followed S. Smith. Bull's case in 1881 was the first case of recovery. Gould's was the second. Fenger, Drinkwater, Teale and Spencer Wells have subsequently reported successful cases. In Australia, hydatid cysts of the lung are operated upon as freely as are those in the liver. Bird was the first to report a successful case, and Mosler came next.

Cartaz considers that the indications for surgical interference are the existence of a clearly defined and localized gangrenous focus or putrid collection of pus, draining imperfectly, or not at all, into the bronchi and causing hectic fever and emaciation. Where surgical interference is called for he considers that to operate upon the supra or sub-clavicular

regions of the lung is too dangerous to be practicable, and that the part of the lung covered over by the scapula is almost inaccessible. The cavity should be opened at its most dependent part and a rubber drainage tube placed in it, a rib being excised only when absolutely necessary. A counter opening, which has been recommended by Fenger, is not necessary in all cases. Care must be taken not to remove the tube too soon, and to see that the cavity really heals up from the bottom. Cartaz considers that in any case demanding operation the two surfaces of the pleura will be found adherent, but he advises an exploratory puncture to determine this point. The lung having been exposed by a bistoury, he favors the division of the lung tissue by the thermo-cautery, as affording protection against hæmorrhage, which may be serious where a knife is used.

A. PEARCE GOULD.



INDEX OF SURGICAL PROGRESS.

Chest and Abdomen.

I. SUPPURATION IN MEDIASTINAL GLANDS, OPENING EXTERNALLY—LOCULATED EMPYEMA. By Dr. EUSTACE SMITH. Child, aged 18 months, was admitted to the East London Hospital for Children, with a history of wasting and night sweats, extending over a period of three months. The jugular veins were very full, and the superficial veins in front of the chest and abdomen were more visible than usual. Percussion note over the upper part of sternum high pitched. Complete dullness over lower half of right back, with great resistance as far as posterior axillary line. Respiration high pitched and bronchial, with large clicks on respiration. Intercostal spaces sank deeply on both sides. The heart's apex was behind the fifth rib, inside the nipple line. Spasmodic cough and short breathing. No retraction of base of chest in inspiration. For a few days some symptoms improved, but on the fourteenth day a small swelling was noticed in the second interspace to the right of the sternum, and another in the episternal notch. A puncture was made but nothing was evacuated; some days later a little pus escaped, and this continued until the child's death about 6 weeks after admission. The openings in the chest wall were found, *post mortem*, to communicate with suppurating mediastinal glands. At the right base behind there was a loculated empyema. The right lung was solid and tuberculous. Dr. Smith observes that the child's illness appears to have begun with an attack of pleurisy, and that the subsequent developments were consequences of the purulent collection. The practical inference to be drawn is that purulent matter ought not to be allowed to remain a day after its presence has been ascertained.—*Med. Times*. 1884. Oct. 18. WILLIAM THOMSON.

II. MALIGNANT STRICTURE OF THE ŒSOPHAGUS, ASSOCIATED WITH A CAVITY IN THE LUNGS—THORACENTESIS. By Dr. CAYLEY. A man, aged 35, had suffered from symptoms of stricture of the Œsophagus for five months. Pleurisy developed, and after a time he expectorated fetid pus. The first time that exploratory puncture was tried with a trocar and canula the cavity at the base of the left lung was not struck. A second attempt was more successful. At the autopsy it was found that the fluids burrowed from the diseased stomach and the Œsophagus into the pulmonary cavity. The operation relieved the distress due to the fetid expectoration. A continuity of space existed through the spleen and diaphragm into the base of the left lung, where the gangrenous cavity was situated.—*Lancet*. 1884. Nov. 15.

H. H. TAYLOR.

III. CONTRIBUTIONS TO ABDOMINAL SURGERY. By Dr. OSCAR WITZEL.

Hydatid Tumors of the Omentum.—A very detailed account of a case, occurring in a girl 10 years of age, is given, which was treated by laparotomy, suturing the sac to the wound, and subsequent incision. The diagnosis had been left uncertain; that of an ovarian cyst had been thought the most probable; no hooks or smaller cysts were found enclosed in the sac. Recovery was complete after less than five weeks.

Alluding to the rare occurrence of solitary echinococcus in the omentum, the author, after citing other cases and two parallel ones of Annandale and Slawjansky, gives the symptoms of the disease. In the first place pain, occurring in paroxysms, gradually increasing in duration and intensity; appearing thus without any inflammatory changes, such pain is rare in other echinococci, and is to be considered as resulting either from torsion of the suspending parts, or from the traction exercised upon the transverse colon and transmitted to the stomach, no adhesions to the abdominal walls, as in other tumors, being present. Comparison, however, with other tumors is very difficult on account of the rare occurrence of the disease.

Secondly, the position of the tumor; it being situated at first in the mesogastric region, near the navel, and afterwards deviating laterally, on account of the proximity of the spinal column, and generally to the left side, on account of the resistance of the liver.

Moreover, the tumor exhibits respiratory movements synchronous to those of the diaphragm, and is, on examination, very easily movable to either side and upwards, but not downwards, both symptoms distinguishing it from ovarian tumors. Tumors of the digestive tract, on the other hand, always produce functional disorders, which in this case are not present. Connection with the liver, spleen and the organs of generation is to be excluded. A movable kidney could easily simulate the tumor in question, while a tumor situated behind the peritoneum could hardly cause a mistake.

The treatment is thus given. In cases of extensive adhesions to the anterior abdominal wall, incision is to be made, with free drainage; if a number of hydatids are found in the lower part of the omentum a series of ligatures is to be applied to the higher parts and the whole omentum removed. In cases of solitary echinococcus in the omentum, without adhesions, the sac is to be secured with sutures to the wound and incised, and drainage tubes inserted—the longer duration of the process being preferred to the probability of causing peritonitis by burying a ligated pedicle; nor is Landau's method of securing the pedicle (if one be present) in the abdominal wound recommended.

Dropsy of the Gall-bladder—Cholecystotomy. The operation of cholecystotomy was performed in a female subject of 47 years of age for dropsy of the gall-bladder caused by impacted gall-stones; the bladder was first stitched to the abdominal walls in the wound and then incised; the patient did not fully recover, but continued emaciated and cachectic in appearance; she was dismissed after three months, retaining a fistula; and died 6 months after the operation. No autopsy could be obtained. The diagnosis had been one of tumor of the omentum or movable hydronephrosis.

After a full account of the case, the author gives quite a detailed historical sketch of the subject of tumors of the gall-bladder. This is followed by a discussion of the pathology of dilatations of the gall-bladder, and the objects to be gained by operative interference. Taking up, next, the clinical symptoms, he formulates these as consisting in a feeling of oppression in the region of the liver, the formation of a pear-shaped tumor, growing downwards from the liver, but movable to either side; generally no fluctuation can be felt. On percussion a tympanitic note may be produced by interposed intestine, or a zone of such timbre may separate the tumor from the liver. Strictureings may occur from circular fibrous cords, giving the tumor an irregular appearance. Fever, rigors, night-sweats point to empyema and also phlegmonous inflammations or symptoms of perforation. Smaller operations are frequent in consequence of these manifestations; opening of abscesses, extraction of biliary calculi from fistulae and trocar-openings.

All laparotomies performed for empyema of the gall-bladder have hitherto resulted favorably; in every case concretions were found; such cases are recorded of Tait, Kocher, König, Trendelenburg and of one unknown operator—all resulted in complete recovery; in two cases, the last but one, fistulae remained.

Turning to the technical aspect of the subject, the author mentions the following methods of operation as liable to come into consideration,—and subsequently criticises them:

1. Opening of an abscess situated in the abdominal wall, or between it and the gall-bladder,—the author favoring the incision and insertion of the finger into the cavity for exploration; in case of subsequent detachment of calculi, dilatation of the fistulous opening may become necessary.

2. Operations indicated in dropsy or empyema of the gall-bladder:

- a. Cholecystotomy in cases where adhesions are present,—cutting through the layers of tissue consecutively.

- b. Cholecystotomy after artificial production of adhesions, (*a*) either without first opening the abdominal cavity, by means of cataplasms (Blochs), or by incision and application of a caustic paste (Richter), or by the trocar being left inserted so as to produce inflammatory adhesion (Richter), or else (*β*) after exposing the gall-bladder, stopping up the wound with some antiseptic substance (Kocher),—the author himself recommending incision without any previous procedures and after a probatory paracentesis, the use of Kocher's method of tamponade, to prevent escape of the fluid into the abdominal cavity.

- c. Cholecystotomy without the production of adhesions, suturing the sac partially or completely emptied of its contents, to the margin of the wound (Tait, Trendelenburg, König)—in which case the author prefers the use of a large trocar, so as to allow of digital exploration on account of thus being able to arrive at a more exact diagnosis.

3. Operations indicated by obstruction of the common bile-duct.

- a. Laparotomy, incision of the distended gall-bladder (cholecystotomy; Sims,

Keen, Ransohoff);—the author recommending insertion of the forefinger and extraction of any loose gall-stones present.

b. Establishing an-artificial fistula leading from the gall-bladder into the intestine ("cholecystenterostomy," Nussbaum). This latter operation, described by Von Winwarter and performed by him in several sittings, is indicated when, in cases of occlusion of the common bile-duct, no malignant disease is found that would of itself endanger life, thus leaving some hope of its maintenance by the operation.

In operating for obstruction of the cystic duct, the spot selected for incision is of little consequence. In cholecystotomy for retention of bile, however, it is of importance to make the incision if possible in the median line, or at least parallel to it, as in these latter cases all unnecessary loss of blood is to be avoided.

After paracentesis, an oval piece of the gall-bladder should be stitched to the upper part of the abdominal wound; the lower part of the wound should then be closed with sutures before incising the bladder. The best method of getting out gall-stones is with the help of irrigation, the patient being placed in a prone position; the opening of the bladder may be held closed around the afferent tube of the irrigator, till the bladder is distended, and then, by suddenly letting go one's hold, the current is made to expel any loose concretions. All impacted biliary calculi should be left untouched, they being generally imbedded in, and covered by the mucous membrane; except in cases where they are situated in the neck of the bladder, when attempts at extraction may be made with instruments.

The subject of extirpation of the gall-bladder, performed four times (and three times successfully) by Langenbuch, is merely alluded to, as being too recent to admit of criticism. In cases of malignant disease in these regions, the author is of opinion that all surgical interference is unjustified.—*Deutsche Zeitschr. f. Chirurg.* 1884. Sept.

W. VAN ARSDALE.

IV. BULLET WOUND OF THE STOMACH. By Dr. M. E. DESCHAMPS. The special object of this paper is to show that a bullet wound of the stomach is not necessarily fatal, and to indicate at least one condition on which the fortunate issue of such an injury might depend, viz.: obliquity in the passage of the bullet through the wall of the stomach. The case on which this view is founded is briefly, as follows: A male, aged 32 years, was admitted at noon on October 5, 1882, to the Lariboisiere Hospital, under the care of Dr. B. Anger. Below the left nipple and a little to the inner side, at the level of the 6th costal cartilage, there was a small circular wound, with its edges contused, discolored, and inverted. No exit wound. At about 10 a. m. he had shot himself with a revolver (calibre No. 7, rifled). The bullet had not passed out again, and was found beneath the skin, close to the vertebral column, at the level of the 9th intercostal space. The patient was pale, respiration difficult, feeling pain at the level of the heart; pulse frequent and small; no elevation of temperature; friction sound over the point of the heart.

6th October. Pericardiac friction gone, no bruit, pulse less frequent, on percussion

stomach seems distended and moved upwards, cardiac dullness diminished. Slight dullness at the base of the chest on the left side and posteriorly, respiration here diminished, no breath sounds, no pneumo-thorax. Slight cough, with occasional bloody expectoration. Patient always pale, fever slight, thermometer never reached 38° C. (100.4° F.) Complete loss of appetite. From this date the patient steadily improved, and the third day thereafter insisted on leaving the hospital, contrary to the advice of the surgeon in charge.

On the 12th October, being three days more, the patient was re-admitted, in the afternoon. At 11 a. m., after drinking freely, he had been suddenly seized with violent pains in the region of the stomach. Thinking that they might be due to colic, he went home, but as they increased steadily, he came to the hospital.

The next day he had the usual symptoms of peritonitis, with considerable dyspnoea. Respirations 58. Skin moist and hot. Rectal temperature 40° C. (105° F.) Pleural effusion increased. Slight cough, but no bloody spit. Stomach much distended and accompanied with great pain, increased by palpation, respiration, and the least movement. On re-entering hospital, bowels had been opened with medicine, and some blood was passed.

Two hundred grammes (6.5 oz.) of a dark-colored blood were drawn from left pleural cavity, and patient expressed himself relieved. On the evening of the 13th, however, patient was much lower; pulse very feeble; extremities cold; face cyanosed; and at 3 a. m. on the morning of the 14th he died in a state of coma.

Post-mortem examination two days afterwards showed general peritonitis with acute injection of the membrane and slight bloody-serous effusion; no false membrane; intestines distended with gas. There were about 300 grammes (9.7 oz.) of blood in the pleura (left); about a tablespoonful in the pericardium. The bullet was found to have passed through the sixth left costal cartilage, then through the pericardium where it is attached to the diaphragm, this last being perforated obliquely. Afterwards the antero-superior and posterior surfaces of the stomach had been struck and the walls dissected up obliquely to the extent of 3 centimeters (1½ in.), but the wound was united by adhesions which were partly broken down. Afterwards the diaphragm had been perforated a second time, and the lower border of the lung traversed. The bullet was found entire between the ninth and tenth ribs.

It is noted by the author that during the patient's first stay in hospital the symptoms were chiefly thoracic, while on his readmission it was the abdominal symptoms which excited most attention, and to them is the fatal result to be attributed. Had the patient not left hospital prematurely and taken to drinking, there is every reason to suppose that he might have recovered. At first there were no symptoms of peritonitis, and the stomach was able to hold the gas which distended it on the second day, and for seven days after the injury to receive and digest liquid food. The adhesions closing the stomach wound showed signs of being freshly broken up, and the absence of any false membrane in the peritoneum pointed to the peritonitis being quite recent, *i. e.*, dating only from the second admission. Reasons are given for

holding that there was nothing necessarily serious in the pneumo-thorax or in the pericarditis. The dyspnoea was attributed chiefly to the injury of the diaphragm.

Another case is referred to in which the patient recovered after showing marked symptoms of injury to the stomach. Here there was a wound in the epigastrium to the inside of the eighth costal cartilage. There were distinct symptoms of peritonitis, with vomiting of blood for several days after his admission. These, however, gradually subsided, and in a month he was quite well, and remained so. The treatment consisted in ice to the stomach, opiates, and very light diet—*i. e.*, a little cold soup and some milk.

Although the wound in the stomach was not proved by post-mortem examination, the symptoms pointed to it, and it is held as probable from the apparently rapid closure of the wound that the opening must have been oblique.—*Revue de Chirurgie*. 1884, 10 Novembre.
C. W. CATHCART.

V. INTERNAL STRANGULATION OF INTESTINE—RECOVERY AFTER LAPAROTOMY. By FRANK S. TRIPP, M.D. Female, aged 57. Obstruction complete for five days. A distinct tumor appreciable in abdominal cavity in umbilical region. Tumor exquisitely tender, with some redness of the overlying skin. Great abdominal distension and urgent dyspnoea. Stercoraceous vomiting incessant and in large quantities. Enemas had brought a few scybalous masses, but no passage through the bowels had occurred. Expression is anxious, but the circulation is good considering the condition of the patient.

A median incision was made five inches in length over the tumor, curving to the left of the umbilicus and one inch below it. On incising the peritoneum, there appeared an adherent and much congested mass of omentum, which was freed by breaking loose many frequent adhesions; and then a mass the size of the palm of the hand was double ligated in three places, divided between the ligatures and removed. On the removal of the omental tissue, at the bottom of the wound was exposed a strangulated knuckle of intestine, intensely congested and distended, but still retaining the glistening appearance which would indicate that fatal strangulation had not occurred. The knuckle was as large as a good-sized hen's egg, and at its base could be felt the margins of a very tight stricture. A probe-pointed curved bistoury was guided on the finger to the constriction, the knife slipped through, and it divided in a direction downward for about one-eighth of an inch. The bowel was then easily reduced, the ligatures around the omental stumps cut short, and the wound closed by three deep and a number of superficial silk sutures throughout its whole extent, though from the appearance of the tissues it was possible that drainage might be required later.

A drainage tube was introduced at the lower angle of the wound three days later. The after progress of the case was attended with gaping of the wound, profuse discharge of pus and sloughy omental tissue. A gradual improvement ultimately took place, and, five weeks after the operation, the patient was discharged, well.—*Louisville Med. News*. 1885. Jan. 17.
G. R. BUTLER.

VI. CASES OF INTESTINAL OBSTRUCTION. In the *Medical Times* for October 25, Dr. H. A. Lediard, F. R. C. S., describes a case of abdominal section for intestinal obstruction. The patient, a female, aged 47, had symptoms of obstruction for one week before admission to the Cumberland Infirmary. As the uterus was less movable than usual, it was thought, before operation, that the obstruction might be due to a band connected with that organ. After opening the abdominal cavity, no definite stricture of the small intestine was found. A Meckel's diverticulum about the size of the thumb was found. This was cut off, and the edges stitched to the abdominal wound, an artificial anus being thus established; from this feces flowed freely. On the eighth day the bowels were moved by the natural outlet. She died on the twentieth day, the symptoms of obstruction having returned; and at the post mortem patches of lymph were found adherent to the intestine in several places, but no very definite obstruction appears to have been met with.

Mr. Gould describes, in the *Medical Times* for November 8, two cases of intestinal obstruction: the one acute, and treated by laparotomy; the other chronic, and treated by colotomy. In the first, a male, aged 55 years, the symptoms had existed for three days before admission. Mr. Gould opened the abdominal cavity and found an internal hernia in the right iliac fossa. It was tightly bound down by a band; a double ligature was placed round this, and it was divided, after which the empty and contracted bowel filled out. He died eight hours after the operation, and at the autopsy it was found that the vermiform appendix had been divided, the portion of intestine strangulated being a loop of small intestine about two feet from the cæcum. The second case was a patient aged 62 years, and the symptoms had continued for thirteen days before admission. Bulging was distinctly marked on the right side. Mr. Marshal introduced his hand into the rectum and explored the sigmoid flexure, with negative results, and then Mr. Gould performed colotomy on the right side. During the operation the peritoneum was wounded, and the patient died in twenty-two hours. At the autopsy a stricture was found in the transverse colon, the nature of which is not stated.

In the *Medical Press and Circular* for November 12 and December 3, 1884, there is an interesting account of a discussion on the treatment of intestinal obstruction originating in papers read by Dr. H. Greves and Mr. R. N. Pughe. The communications related the case of a little boy who suffered from symptoms of acute strangulation. There was intumescence in the right iliac fossa. As symptoms of intussusception were absent, the diagnosis of obstruction by band was made. Upon opening the abdomen, the small intestine immediately above the cæcum was found to be greatly distended, and to have lost its gloss. It was bound down by a band which, on being cut through, was found to be the appendix vermiformis, the free end of which had become attached to the caput cæci. The boy recovered without a bad symptom.

In the subsequent discussion Mr. Alexander stated, as a result of his experience, that the most common situation for intestinal obstruction by a band was at the

vermiform appendix; the next was at the sigmoid flexure, and the third at the region of the gall-bladder.

At the Belfast meeting of the British Medical Association, Mr. A. K. Young, F.R.C.S.I., of Monaghan, read the notes of a case of intestinal obstruction which had been under his care. After failing to obtain relief by purgatives, he tried a forcible injection of water, by means of a tube connected with a cistern 30 feet above the level of the patient. This likewise failing, he poured through an œsophageal tube 2 lbs. of metallic mercury, and subsequently a further dose of 1 lb. 2 drs. No motion of the bowels following, the patient left hospital, traveling a long journey in a country cart without springs. Five days after the doses of mercury, some of it passed from the rectum, followed by an enormous quantity of feces. He, however, died seven weeks afterwards, with symptoms of obstruction. Mr. Young brings forward no conclusive evidence that his case was one of intussusception, as distinguished from other forms of intestinal obstruction, and after a perusal of his paper we do not feel inclined to return to the practically obsolete treatment by metallic mercury for intestinal obstruction.

At a meeting of the Pathological Section of the Society of Medicine, in Ireland, November 7, 1884, Mr. Kendal Franks read a paper upon a case of intussusception treated by abdominal incision. It was found that a piece of small intestine measuring 9 inches, and at a considerable distance from the ileo-cæcal valve, was included. Great difficulty was experienced in reduction, the peritoneal covering tearing in several places during the attempt. Part of the gut was almost gangrenous. The patient died in a few hours.

VII. TREATMENT OF HEMORRHAGE AFTER OPERATIONS ON THE RECTUM. By Mr. SAMUEL BENTON. The author brings to the notice of the profession a useful instrument for checking hemorrhage after rectal operations. It consists essentially of a piece of catheter tubing surrounded by a bag of thin rubber. When introduced into the rectum, the rubber bag is inflated to any extent required, and so a considerable amount of pressure can be brought to bear on the bleeding surface, in the same way that a similar apparatus is used for the relief of epistaxis. Mr. Benton's bag is constricted in the middle (like a Barnes bag), so that the amount of pressure on the sphincter will not be too severe. The catheter tube, by allowing the escape of flatus, contributes much to the comfort of the patient. The inventor considers that, in addition to its use as a hæmostatic, it will prove serviceable in the treatment of some rectal diseases where even pressure is indicated, as in non-malignant strictures of the rectum.—*Brit. Med. Jour.* 1884. Dec. 13.

C. B. BALL.

Extremities.

I. LYMPHANGITIS OF THE UPPER LIMB. By Dr PAUL BERTHOD. The frequency of lymphangitis in the upper limb is explained by the greater liability of the part to wounds, and to its richness in lymphatics. The manifestations of the disease being

very complex, it is easy to understand how it has been confounded with other affections. Erysipelas, diffused phlegmon, and lymphangitis are very frequently alike, and even microscopically it is very difficult to find a difference between the anatomico-pathological lesions observed in the lymphatics and in allied affections. Perhaps in these diverse morbid manifestations there is only a difference in the infective agent or in the structure affected; perhaps there is only a question of degree, and the terms phlegmonous erysipelas and phlegmonous angioleucitis are used to show the close relationship which exists between these different affections. The character of lymphangitis is to develop from slight wounds, only involving the epidermis, such as erosions; or, when it occurs in connection with a less superficial wound, at the termination of that wound, when, cicatrization being complete, there is only wanting an epidermic pellicle. The frequent lymphangitis in diseases of the skin which attack the epidermis exclusively (psoriasis, for example) proves this. It seems that the superficial lymphatics are more sensible than the deeper to septic products. In a case in which a boil in the fold of the elbow was followed by lymphangitis and abscess in the forearm, Berthod thinks that we may find an anatomical cause here, as in the breast, in the existence of recurrent lymphatics. It is not rare to observe in cancer of the mamma, symptomatic adenitis in both axillæ—as well on the healthy as on the diseased side. Although almost always produced by an insignificant wound, lymphangitis is not the less grave on that account. Jalaguier describes a gangrenous lymphangitis which has proved fatal in old persons, or in alcoholics or diabetics.—*Gazette Medicale de Paris*. 1884.

II. CIRROID ANEURISM ON THE DORSUM OF THE FOOT. By Mr. WALTER EDMUNDS. At the Royal Med. Chir. Soc., October 28, 1884, Mr. Walter Edmunds read a paper bearing this title. The patient was a man, aged 29. Pulsation could not be completely arrested by compression of the anterior tibial artery. Esmarch's bandage was applied, without benefit. The aneurism was dissected out, seven communicating vessels requiring ligature. The patient recovered. In a discussion which followed, Mr. Barwell inquired whether the case was one of true cirroid aneurism, or one of sacculated aneurism with which many arteries communicated. Mr. Edmunds replied that the disease was not true cirroid aneurism.—*Lancet*. 1884. Nov. 1.

W. THOMSON.

Genito-Urinary Organs.

I. TUBERCULOSIS OF THE GENITO-URINARY TRACT, MORE ESPECIALLY AS INVOLVING THE KIDNEY AND TESTICLE. By FRANK W. ROCKWELL, M.D. Tuberculous inflammation, which gives rise to symptoms of sufficient gravity to be grouped and studied by themselves, occurs only in two of the organs constituting the genito-urinary tract—viz., the kidney and testicle. Renal phthisis is many times found in subjects free from hereditary taint. The disease is twice as frequent in males as in females, and while in the former the generative organs are frequently affected, this is

very seldom or never the case in the latter. It is most common in middle life. Commonly both kidneys are diseased, but in many of the unilateral cases the epididymis or testicle of the corresponding side has been also found diseased. Stress is laid upon this fact as indicating a close relation, at least in the male, between tubercular disease of the generative system and that of the kidney—a relation of cause and effect. The symptoms of tubercular kidney are chiefly those of chronic pyelitis. Significantly, the processes in secondary disease begin in the mucous surfaces of the pelvis of the kidney, the papillæ being the first portion of renal tissue involved. Diagnosis is not easy, unless it coexist with phthisis of some other organ. A nodular condition of epididymis, testicle, prostate gland and seminal vesicles, associated with progressive wasting, hectic, hæmaturia and lumbar pain or tumor, form the features of this rare affection. The author details a case; male, ætat. 37, single, sustained trauma of the perinæum in October, 1882. Some swelling and inflammation followed, lasting two months. In July, 1883, he had a stricture and enlarged, tender prostate. No history of gonorrhœa. Chills, fever, night-sweats, and colliquative diarrhœa ensued. In September, 1883, his lungs became tubercular. Prostate gland much larger and studded with small nodules; no softening. Death in October, 1883, one year after the trauma. Left kidney contained a few caseous foci. The right was one mass of disease, a few points of healthy tissue remaining at the cortex. All the pyramids cheesy. Pelvis and ureter of right thickened and tubercular, their mucous membrane cheesy. The bladder contained greenish muco-pus, its walls thickened and studded with small nodules. Prostate tubercular. The case undoubtedly began as a tubercular affection of the prostate or bladder, and ended with tubercular kidney and pulmonary phthisis. Had the starting-point of the disease been in the epididymis or testicle, the result would have been the same. In view of the fact that the primary cheesy inflammation is generally seated in the epididymis, that the process is conducted to the kidney either by direct continuity, or discontinuously, and that such foci are extremely liable to set up general or pulmonary tuberculosis, the author urges that in all cases which are unable to avail themselves of every means generally used to arrest tuberculous disease, the affected testicle or testicles should be excised. R. reports a case in which he removed a testicle, the seat of caseous epididymitis, with entire recovery; thereby, he argues, avoiding subsequent serious developments. —*New York Medical Journal*. 1885. Jan. 10. Vol. xli., No. 2.

G. R. BUTLER.

II. WHICH IS THE MORE FREQUENT SITUATION IN MALES OF THE INITIAL SIGN OF SYPHILIS? By Mr. FRED. W. LOWNDES. The author analyzes the statistics derived from 400 cases of indurated chancre observed by Dr. Bernard and himself at the Liverpool Lock, Seaman's Dispensary, and private practice. His results go to prove, as has been pointed out by several previous writers, that the most common site is on the prepuce (in his cases nearly one-half), and that of these the majority occur on the inner prepuce.

Mr. Lowndes further calls attention to the interest and desirability of obtaining

statistics on the following points, viz.: 1. The relative proportions of single and multiple infecting sores. 2. The comparative frequency or rarity of the absence of induration. 3. The varying periods of incubation, in days. 4. The proportionate frequency of the presence of indurated inguinal glands. Mr. Lowndes has had forms drawn up for recording these points, and offers to send a specimen sheet on application.—*Lancet*. 1884. 11. Oct.

H. F. WEISS.

III. ON THE TREATMENT OF RUPTURED KIDNEY. By Mr. H. A. REEVES. In the case which is described by Mr. Reeves, the patient, a youth, aged 19, came in having fallen from a cart and fractured his seventh and eighth ribs on the right side. He complained of great pain, and passed in the evening a little smoky urine. The next day the blood was much increased in amount; at one time he passed more than a pint of all but pure blood. His symptoms were alleviated by turpentine and subcutaneous injections of sclerotic acid, but about fourteen days after the accident his pain became aggravated, abdominal tenderness set in, and all the symptoms of peritonitis, giving rise to death about four weeks after the accident.

The post-mortem revealed a large cyst in the situation of the right kidney, which was almost entirely obliterated, and a small aneurism of a branch of the renal artery; whilst the bladder contained some hard masses of decolorized blood-clot.

Mr. Reeves suggests that such a case in future should be treated by cystotomy so as to wash out and drain the bladder, drainage of the kidney from the loin, and, if this failed, by nephrectomy through the linea semilunaris, taking care to isolate the peritoneum at once from the previous drainage of the wound posteriorly. The treatment to be successful must be carried out soon after the injury.—*Lancet*. 1884. Oct. 4.

IV. NEPHRECTOMY IN AN INFANT. By Mr. J. RICKMAN GODLEE. A tumor was first noticed in the region of the right kidney in June, 1883. This gradually increased, and after consultation, it was decided to remove it by Langenbuch's incision in the linea semilunaris. The operation was readily accomplished, and the child was about in six days. The ureter was ligatured and returned into the wound, and during the ligature of the renal vein a clot was seen extending into the vena cava. The tumor weighed about a pound. The child died, age 2 years, in February, 1884, from a recurrent growth in the right iliac fossa.

W. B. CLARKE.

V. PERIORCHITIS AND PERISPERMATITIS CHRONICA HÆMORRHAGICA. By Dr. E. WALLACH (Frankfort). Five cases of Hæmatocele vaginalis, one complicated with hæmatocele funicularis. He also mentions a rare preparation showing a completely calcified hæmatocele extravaginalis.—*Mittheil. aus d. Chirurg. Klin. zu Tübingen Hft. iii., Bd. i.* 1884.

WM. BROWNING.

VI. A CASE OF SUPRA-PUBIC OPERATION FOR LARGE STONE IN THE BLADDER. By Sir H. THOMPSON. Removed from the bladder of a gentleman, æt. 36, a cystic oxide calculus weighing two and three-quarter ounces, by means of the supra-pubic incision. Lithotripsy was attempted, but failed, the stone being too large to be grasped

by the lithotrite. This being followed by fever, two weeks elapsed before the patient was submitted to lithotomy.

Under ether, 10 ounces of a solution of boracic acid were injected into the bladder, and the rectum was distended with an india-rubber bag, filled with 12 ounces of water. By this means the bladder was made to protrude well above the pubes. The stone having been extracted through a supra-pubic incision, the bag was removed from the rectum, a catheter tied in per urethram, and a drainage tube placed in the bladder above the symphysis. The patient was kept on his side, the author laying stress on this as providing better for drainage. With the exception of some secondary hemorrhage from the wound and an attack of epididymitis, the patient convalesced well. The tube was removed from the bladder on the fifth day, and the catheter on the sixth. The first urine passed naturally by the penis on the fifteenth day after the operation.—*Lancet*. 1884. Oct. 11.

VII. VILLOUS TUMOR OF BLADDER—MEDIAN CYSTOTOMY—DEATH. By Mr. REGINALD HARRISON. Median cystotomy for the removal of a villous tumor, pieces of which the patient, a man, æt. 42, had been passing for 18 months. Hæmaturia was also severe. The median perinæal incision was enlarged by incising the roof and floor of the prostate, to give more space for manipulation. A large portion of the growth was removed by scoop and forceps. As the patient's condition would not allow of prolonged manipulation, a portion of the growth was left behind. Death took place 12 hours after the operation, from syncope.

Mr. Harrison remarks that had operative measures been undertaken earlier, no more favorable case could have been desired, as the post-mortem showed that the tumor was attached by means a pedicle two-thirds of an inch in diameter, or the size of a shilling. Had it been possible to apply it, a ligature seems to have been indicated.—*Lancet*. 1884. Oct. 18.

VIII. OBSERVATIONS ON THE AFTER-TREATMENT OF LITHOTOMY WHERE THE BLADDER IS SACCULATED OR POUCHED. By Mr. REGINALD HARRISON. The author recommends that in cases after lithotomy where there is much pouching of the bladder behind an enlarged prostate, drainage should be secured by a freer division of the prostate than is usual, and by the retention of an ordinary lithotomy tube through which is passed a soft rubber catheter. In cases of sacculated bladder, Mr. Harrison says that by this means any sacculæ may be washed out. He would retain this tube in cases of calculus associated with residual urine and enlarged prostate for a considerable time—viz., from 6 to 10 weeks.

The end of the catheter not in the bladder is passed into a bottle conveniently placed, by which means the patient is kept drier than is usually the case. The author finds that a solution of common salt answers best for washing out a bladder where there is much mucus secreted.—*Lancet*. 1884. Nov. 8.

IX. THE TREATMENT OF GONORRHEAL EPIDIDYMITIS BY THE APPLICATION OF CLAY TO THE SCROTUM. By Dr. LOUGAGHEVITCH. In Russia, clay is a popular remedy for allaying fever, when mixed with vinegar. It has also been employed in

hysteria and in cases of aneurism. Dr. Loncacevitch states that he has lately been treating cases of gonorrhœal epididymitis by the application of clay to the scrotum.

He takes white sculptors' clay and makes it into a paste with water, spreads it on linen, and applies it to the scrotum, which is to be kept raised in bed. The application is to be changed twice a day. The author asserts that even in ten minutes after the first application the pain is considerably lessened. Treatment should be continued for four or five days. Up to the present time Dr. Loncacevitch has treated 25 cases by this means successfully.—*Gazette Med. de Paris*. 1884. Nov. 22.

X. A DRESSING FOR THE WOUND IN PERINEAL LITHOTOMY. By Dr. JARDIN. The following antiseptic dressing for the perineal incision in lithotomy is recommended. Fifteen to eighteen small sponges, each of the size of a filbert, are to be fixed on a string, about a centimetre apart. Having been dipped in a strong carbolic acid lotion, they are squeezed out and passed into the wound around the lithotomy tube; thereby fixing it and isolating it from the sides of the wound. Over this, outside the wound, antiseptic pads are placed, with a hole in the centre for the tube. These external dressings are to be changed daily. The tube and surrounding sponges may be removed on the third day. Dr. Jardin says that this dressing, after a considerable trial, has been found to answer well.—*Gaz. des Hôp.* 1884. Nov. 29.

XI. EXTRAVASATION OF URINE AND URINARY ABSCESS. By M. TERRILLON. The author divides cases of extravasation of urine into two classes: 1st. Escape of a large amount of urine through a large rupture. 2d. Extravasation of the urine in a few drops at a time by each act of micturition.

Attention is drawn to the fact that sometimes urine may be extravasated into the cellular tissue without giving rise to inflammation, and, if not too large in quantity, may be absorbed; but for this to occur, the urine must be normal. In every case of stricture the urine is unhealthy, and so provokes gangrene.

Regarding the formation of a urinary abscess, the walls of which are often of cartilaginous hardness, M. Terrillon says: Immediately behind a chronic stricture, the urethral mucous membrane is congested and ulcerated; the tissues outside the urethra become inflamed and indurated. During micturition, the diseased mucous membrane gives way at one small spot and allows the escape of a drop or two of urine into tissues already prepared to receive and limit it. These indurated swellings in perineo always have a central cavity containing pus and urine. They require early incision, which often has to reach deeply in order to open the cavity. The surgeon must not be timorous, and should keep to the raplie. Where a urinary abscess has given way, leading to one or more fistulæ the walls of which are usually indurated, the use of the thermo-cautery is recommended in preference to the bistoury, as tending to promote absorption.—*Le Progrès Médical*. 1884. Nov. 1.

XII. OLD COXALGIA—ABSCESS OPENING INTO BLADDER, FOLLOWED BY CALCULUS—LITHOTRITY—DEATH. By Dr. TUFFIER. The patient, a robust man, aged 45, who had suffered for 10 months, came to the Hospital Neckar with the following

symptoms: Increased frequency of micturition, which was painful toward the end of the act; pain, passing from the renal region down the legs, increased after exertion; the urine for the first month had been thick and fetid, with a white, sandy deposit and pus. M. Guyon diagnosed vesical calculus, and at the same time remarked that it was unusual in these cases to get so much cystitis.

A fortnight after admission lithotripsy was performed. Twenty-four hours after the operation pain and swelling commenced in the right buttock. It was now discovered that there were two cicatrices at the upper and outer part of the right thigh, pointing to suppuration which occurred at the age of 13, and lasted 8 months. The femur in its upper part, together with the trochanters, was enlarged. The swelling in the buttock and the cystitis increased. After the lapse of a few days an incision was made into the swelling under the gluteus maximus, with the effect of giving exit to a sero-purulent fluid having a fæcal odor. The finger inserted into the wound passed beneath the great sacro-sciatic notch into the pelvis. A drainage tube was inserted and antiseptic dressings applied. During the following days the edges of the wound sloughed, and urine escaped freely into the dressings. The patient died 22 days after the crushing.

The post-mortem revealed that the hip joint had been the seat of the old strumous disease. The head of the femur was flattened. The cotyloid cavity was not perforated, but irregular and surrounded with osteophytes. The bladder was adherent to the left side of the pelvis. In this viscus was a fragment of phosphatic calculus. About the centre of the right side of the bladder was an aperture of the size of a two-franc piece, the bladder wall being here replaced by bone (*os innominatum*). The margin of the aperture was adherent to the bone, except below. The bone, which was denuded of its periosteum, thus formed part of the bladder wall, and was consequently bathed with urine. At the lower part of the aperture, where the edge was not adherent, a probe could be passed through the pelvis into the wound in the gluteal region.

M. Tuffier remarks that cases of abscess of bone opening into the bladder are rare, and he does not know of another case where calculus has followed this lesion. Where there is much pus passing from the bladder of a patient suffering with calculus, it behoves the surgeon to seek diligently for some extraneous cause.—*Le Progrès Médical*. 1884. Nov. 15.

XIII. NON-URINARY URETHRAL FISTULÆ. By Dr. RELIQUET. These fistulæ are always secondary to an abscess developed in a urethral gland. In the great majority of cases it is Cowper's gland which is at fault. These fistulæ permit fluid injected into them to pass into the urethra, but do not of necessity allow urine to pass in the opposite direction.—*Gaz. des Hôp.* Nov. 13, 27, and Dec. 6.

F. SWINFORD EDWARDS.

REVIEWS OF BOOKS.

SURGICAL HANDICRAFT: A Manual of Surgical Manipulations, Minor Surgery and other matters connected with the work of House Surgeons and Surgical Dressers; with 208 illustrations on wood. By WALTER PYE, F.R.C.S., Surgeon to St. Mary's Hospital and to the Victoria Hospital for Sick Children; Examiner in Surgery in the Glasgow University, etc., London, Henry Kimpton, 1884.

In the preface the author says: "In this book I have endeavored to describe the details of surgical work as it appears from the point of view of house surgeons and dressers in surgical wards;" and, so far as regards an immense number of wards in England, perhaps the majority, he has endeavored with great success, producing an account at once truthful, artistic, forcible, full and pleasant to read.

But it might perhaps have been better to have "described the details of surgical work as" they *ought* to appear, rather than as they do appear to the young gentlemen for whom the book is written. The author has had a grand opportunity and so far as regards this edition of his book, has not taken full advantage of it. Surgery as he himself truly says, "is becoming every day more and more scientific," and he might have added that its scientific character is nowhere so much shown as in its details. Almost all that part of minor surgery which deals with wounds has been radically changed by surgical science; but the mass of Mr. Pye's book betrays no suggestion of such an alteration. Take for example the otherwise admirable and very complete chapter on hæmorrhage. Speaking of plugging he writes:

"The best materials for plugging are (1) sponge in small pieces, quite dry, and compressed until they are hard; (2) strips of lint not more than three-quarters of an inch wide; (3) cotton wool. Of these the first—sponge, is by far the most effective, although it is not so easy to apply. The best way is to take quite small pieces, and after drying them as far as possible, to pack them into the wound with a short director," etc. * * In a similar fashion must the narrow strips of lint be packed into the wound." Not a word of caution as to the possible effects of packing dry sponge and lint into wounds. It is true that *everything* respecting surgical dressing cannot be got into one chapter, so let us turn to the author's chapter, XVI., "Of the dressing of clean cut or incised wounds." Here we read that, for the cleaning of the wound, "plain water will do, but a lotion of

carbolic acid of a strength of from 1 to 40 or 1 in 100 is better." Our author continues, "if there is any suspicion that septic or poisonous matter has been introduced into the incision, (*e. g.* in a dissection wound) it should be thoroughly swabbed or syringed out with a 1 in 20 carbolic lotion, or one of chloride of zinc, in the proportion of 40 grains to the ounce."

Now lest us suppose a student with a considerable and bleeding wound to deal with, and using Mr. Pye's book as a book of reference. He would naturally turn to the two chapters from which I have just quoted. He would *guess* as well as he could, whether there was any suspicion of septic infection, if he found that the wound had been made with a clean *looking* knife, he would probably plug the wound with clean *looking* pieces of dry sponge or lint, and now what would be the chances for or against suppuration with its possible consequences.

Again "the Listerian method" is "that especial form of cleanliness." Is that all? Does such a phrase suggest the truth even in part? If it does it suggests also a considerable modicum of untruth. There are few stock expressions of the gentlemen who run with the hare and hunt with the hounds in modern surgery, which are more odious to the writer of this Review than that which describes the modern antiseptic principle and practice as a form of cleanliness. If it *is* a form of cleanliness, then brewing ale is a form of dirt. No falser idea could be put into a student's head; once in, all the king's horses and all the king's men are powerless to drag it out.

It is, however, useless to pursue the subject further. The book will soon reach a second edition and we earnestly beseech the author to then try to infuse the right spirit in it from beginning to end.

The descriptions throughout the book are excellent and full. The chapter on the use of catheters is good, that on trusses and hernia is not so satisfactory, in which respect it resembles every similar chapter in every English text-book with which we are acquainted. The very practical chapter on anæsthetics is by Mr. Joseph Mills and is well worth reading. There are special chapters also on teeth extraction, by Mr. Howard Hayward, and on aural surgery by Mr. J. P. Field. An excellent feature of the book is formed by the marginal notes which are most convenient.

In the first edition of so large a book are sure to be some minor errors including misprints and slips of the pen. In this for instance, we have at page 105, "doe snot" for does not; and we are told that "the great advantage" of the clove-hitch "is that it gets tighter the more it is pulled upon," which is just what it does *not* do. But there are other errors which can scarcely be put down to the printers. For

instance Macewen's chicken-bone drainage tubes are confounded with Neuber's bone tubes; and at page 35 we read, "another way of stopping general oozing, which is too rarely employed in this country, namely by the application of flannel wrung out of boiling water, but not so thoroughly as to be quite dry, and applied immediately. This should be pressed on the bleeding surface (e. g. to an amputation flap) for a few seconds. On its removal, the tissues will have a whitish look, and the hemorrhage will have all ceased." Now the proper plan is not to *scald* the stump, but use water of temperature above 120°.

To sum up, the student and hospital resident will find this a useful book, unsurpassed by any other work of the kind; and but for its attitude towards the antiseptic principle and practice, a book for the most part as reliable and safe as it is comprehensive and clear.

C. B. KEETLEY.

THE INTERNATIONAL ENCYCLOPÆDIA OF SURGERY. A Systematic Treatise on the Theory and Practice of Surgery by Authors of Various Nations. Edited by JOHN ASHHURST, JR., M. D., Professor of Clinical Surgery in the University of Pennsylvania. In six volumes VOL. V. New York: William Wood & Company. 1884.

Article I. INJURIES OF THE HEAD. By CHARLES B. NANCREDE, M.D., Professor of General and Orthopædic Surgery in the Philadelphia Polyclinic, &c.

Article II. MALFORMATIONS AND DISEASES OF THE HEAD. By FREDERICK TREVES, F.R.C.S., Assistant Surgeon to, and Lecturer on Anatomy at, the London Hospital,

I. In this section Dr. Nancrede has taken up, in order, *injuries of the scalp*, the *bones*, the *meninges*, the *brain* and the *cranial nerves*, and has added paragraphs upon *cerebral localization* and the *operative treatment of epilepsy of cranial origin*.

The antiseptic treatment of all wounds of this region, accidental or surgical, is strongly advocated—preference being expressed for the use of the corrosive sublimate solution, of strength usually of one part to two thousand. The old-time "antiphlogistic treatment," by bleeding and the administration of calomel, is regarded with more favor than by most of the more recent writers, and its employment is directed in the severer and more dangerous inflammatory states. It is to be hoped that before long investigations in experimental therapeutics will determine whether or not it is true that favorable effects are produced by bringing "the system as rapidly as possible under the influence of mercury," and if true, what is the *modus operandi*. Perhaps the prop-

sition may have to be stated somewhat in this way: "Inflammation is the result of the action of micro-organisms, mercury destroys micro-organisms, therefore mercury controls inflammation."

As regards the use of the trephine, Dr. Nancrede speaks with no uncertain voice. In bone contusions of the anterior parietal region with associated "paralytic, irritative, or convulsive symptoms on the opposite side of the body;" in compound, depressed fractures, especially those that are comminuted; in simple, depressed fractures in adolescents and adults; in punctured fractures; in cases of extensive hemorrhage from the middle meningeal artery; and when there is good reason for believing that a cerebral abscess has formed, and the symptoms fairly well locate its position, trephining is directed to be performed. The propriety and necessity of the operation in most of these conditions, will not be disputed. Should recourse be had to it when the depressed fracture in an adult is unaccompanied with a wound of the overlying soft parts? As a rule, we would unhesitatingly agree with our author, and say yes; taking into consideration the dangers of early inflammation and the formation of abscess, of the later production of an epileptic state or a condition of mental weakness or irritability, and having regard to the accumulating evidence of the comparatively low mortality of the operation *per se*. Attention is duly and strongly called to the fact that the use of the trephine is contra-indicated when the symptoms present are those of diffused meningitis or of cerebral lesion at some point remote from the site of the cranial injury; although in the latter condition cerebral localization may sometimes indicate a proper place upon which to apply the instrument. The long-standing direction not to trephine over the longitudinal or lateral sinus is not repeated; it being, on the contrary, stated, and we believe with perfect truth, that "the ease with which hemorrhage from these venous channels can be arrested, proves that, as far as bleeding goes, trephining can be safely performed over the course of either."

Of the value of the operation in certain cases of epilepsy, Dr. Nancrede speaks quite favorably, basing his opinions largely upon the statistics presented by Mr. Walsham and the reported personal experience of Prof. Briggs. He very pertinently, however, calls attention to the fact that "the operation removes the most important cause of the epilepsy, but only one cause. The disturbed circulation in the nervous centres, and the excessive mobility of the nervous system, can only disappear with time; and if all other sources of peripheral irritation are not most carefully guarded against, the patient may be slightly if at all benefited; whereas judicious after treatment will sometimes relieve an apparent operative failure." In the treatment of scalp wounds, "chiefly dan-

gerous from their complications," sutures are believed to be "as a rule unnecessary," the gauze-and-collodion dressing being ordinarily preferred. We are pleased to see that cutaneous erysipelas is declared to be "rarely grave." In the treatment of the phlegmonous variety numerous small punctures or incisions are advised, rather than one or more long cuts.

Skull fractures, whether of the vault or base, are, and that with truth, declared to have "no inherent danger over and above similar injuries of other bones," and not to be, *per se*, dangerous injuries. In explanation of the commonly-met-with greater splintering of the internal table, "Teevan's law" is given and explained; but no notice is taken of that other physical law that splintering is always in inverse ratio to momentum, and the fact that the fracturing force is in these cases much diminished in transmittal through the skull layers with their varying density of compact and cancellous tissue. In explanation of the occurrence of basal fractures from violence inflicted at a distance, due notice is taken of the conducting ridges of the skull, to which Mr. Hilton more than a generation ago so strongly called attention; and all the thicker portions of bone are regarded not only as better conductors of vibrations, but as actual "*amplifiers* of the same." "The theory that vibrations of the brain produce fractures of the orbital plates," is declared to be "too manifestly untenable to demand refutation." This may be true in ordinary injuries, but it must be remembered that in penetrating wounds, e. g. gunshot, not only are vibrations produced, but also a hydrostatic pressure in the traversed brain, which, as was shown by Busch and Kocher's experiments, is amply sufficient not only to cause fracture of the delicate orbital plates, but shattering and scattering of the cranial walls.

In establishing the diagnosis of basal fracture, free watery discharge is regarded of great importance only when occurring very early; a later flow, especially one following moderate hemorrhage, being pronounced a symptom of "questionable value." Extensive extravasations between the skull and dura mater are believed to uniformly cause death, unless removed by operation; the diagnosis being questioned in those cases in which recovery followed rest and constitutional treatment. The existence of concussion of the brain, pure and simple, "vibration without lesion," is denied, there being always, it is claimed, "either a disseminated congestion of the organ or contusion of some portions of its structure." Duret's views upon the action of the intracranial fluid are fully accepted. In the treatment of the stage of collapse, if stimulants must be given, hot coffee is preferred to either ammonia or alcohol.

In writing of the prognosis in cases of *hernia cerebri*, Dr. Nancrede states that of 80 cases he had collected, 25 ended favorably; not that such small number "settles the percentage of mortality," but giving the figures "for what they are worth." We are inclined to think that few surgeons will see in them anything of much value. Thirty per cent. of recoveries is, we are sure, altogether too high; and the statement of it can only lead the inexperienced to indulge hopes almost certain to be disappointed.

As a diagnostic sign of abscess "involving the cerebral tissue alone," attention is called to what is believed to be a fact, viz, that the temperature in such cases is subnormal, or at least not elevated. It was with much pleasure that those present at the last meeting of the American Surgical Association listened to Dr. Nancrede's remarks upon this subject; and it is certainly worth the while for every one to carefully investigate this matter. If subnormal or normal temperature always means abscess of the brain substance, and elevated temperature meningeal disease, either alone or complicating the cerebral lesion, we have in the use of the thermometer a sure and ready method of determining a very important point, to wit, whether or not we have in a given case a fair probability of being able to reach the pus and relieve the symptoms.

In the short subsection upon cerebral localization, attention is confined, as might naturally be expected, to the motor area about the fissure of Rolando; for finding the position of which latter a convenient and ready method is given. Though, as is very properly said, "the whole subject of cerebral localization is yet in its infancy." Even now every surgeon recognizes its importance, and hopes that in the near future it may be made much more directly and surely a guide to operative interference. Though in a general way limited paralysis points to lesions of determined parts of the mass bordering the Rolandic fissure, once in a while cases are met with which show that thus far the localizations are but "provisional;" and in the study and analysis of these cases lies the pathway of future progress.

It is the exceptions that test the law; and theories must be made to square with facts, not facts with theories. We have ourselves, for example, seen arm-paralysis (and no other) associated with abscess in the foot of the first frontal convolution, the rest of the motor area being healthy, the abscess having resulted from a neglected punctured fracture.

Brief notices of the injuries of the several cranial nerves and of the secondary affections of the brain, as indicated in the mental state, the condition of the special senses, and that of the circulatory, the digest-

ive and genito-urinary organs, complete the chapter and bring to a close this interesting and valuable contribution to surgical literature.

The author, the editor and the readers may well congratulate themselves upon the admirable way in which has been treated a subject than which none is more interesting—because of the gravity of these head injuries and the diversity of opinion that has been entertained respecting the nature and proper treatment of certain of their symptoms.

II. In the nearly seventy pages devoted to the consideration of the diseases and malformations of the head, Mr. Treves has briefly but clearly treated of a large number of affections, beginning with the consideration of erysipelas, and closing with a full page, "General scheme of the tumors of the vault of the skull, arranged for diagnostic purposes." Of the gravity of erysipelas of the head—that "surgical bug-bear," which is by authors and teachers commonly represented to be a very dangerous condition, because of the fancied great liability to the occurrence of meningeal inflammation—we are told (and facts prove the truth of the statement), that while it is a little greater than when the disease is located on the trunk or extremities, yet in the great majority of cases "perfect recovery follows." In the paragraphs on ulcers, a distinction is made between rodent ulcer and epithelioma (regarded as "rare"); a distinction which, by very many, will be regarded as one *sine differentia*.

Tumors, both of the scalp and skull, are treated of quite at length; and every one will, we are sure, be much interested in what has been written upon *pneumatocoele*, *meningocele*, *encephalocoele*, and *hydrencephalocoele*, the elements of the differential diagnosis of the congenital protrusions being well set forth in tabular form. Respecting operative interference in cases of such infantile tumors, it is distinctly stated that it is "only justifiable under *one* condition, and that is when rupture of the tumor is threatening." We are a little surprised to notice that removal of small congenital cysts about the orbit is not favored; for although it is true that the danger attending them is not great, still for æsthetic reasons, if no other, they had better be taken away.

In the treatment of small superficial naevi, the use of the thermo-cautery is advised, and in cases of "large venous naevi and cavernous tumors of the width of a shilling and larger," it is recommended to slice off the whole mass four days after its ligation; "the duration of the treatment is very greatly diminished, the risk of ill effects much lessened, and a much cleaner and finer scar is produced." Attention is called to the probability of the existence, "more frequently than is at present supposed," of a communication, by small veins, between a naevus and the superior longitudinal sinus.

As a means of preventing hemorrhage when the whole mass of a cirroid aneurism is cut away, preliminary ligation of the *common* carotid is advised (or the adoption of some local means), and the same artery, it is said, may be tied when a large hypertrophied mass of the scalp is to be removed. It is certainly much safer to tie the *external* carotid.

Inflammations of the skull with caries and necrosis are very fully considered, due recognition being made of the great causative influence of syphilis.

One sentence has particularly attracted our attention, viz: "Speaking without the guidance of any actual statistics, cerebral troubles would appear to be more frequent after syphilitic necrosis than after the traumatic form of the disease." Is this true; and if so, are not the troubles rather associated with than consequent upon the necrosis, and due to independent visceral affection?

Hypertrophies of the skull are classified under four heads; "1. Simple hypertrophy, general or local; 2. General 'concentric hyperostosis;' 3. 'Osteoporosis' in its various forms, the 'diffuse excentric hyperostosis' of some authors; 4. 'Leontiasis ossium,' or 'limited excentric hyperostosis.'" "Craniotabes," owing mainly to the researches of M. Parrot, Dr. Barlow and Dr. Lees," is considered to be "a manifestation of hereditary syphilis."

In cases of *fungus of the dura mater*, it is advised that operations should not be undertaken for the entire removal of the mass; "for such operations would fall short of their purpose, unless with the tumor was excised a considerable portion of the dura mater. Whether antiseptic surgery can render such procedures less fatal than they are at present, remains to be seen."

The concluding sections of the article are upon *intra-cranial aneurism* and *chronic hydrocephalus*. Paracentesis in the last-mentioned affection is favored "in cases of great enlargement, with steady increase. In cases of external hydrocephalus it is more likely to be followed by a good result than in cases of ventricular dropsy." It is deemed "inapplicable to cases due to cerebral mal-development," and its employment is to be condemned "in congenital cases, in cases associated with preceding acute cerebral disease, and in cases marked by extreme mal-nutrition."

Though perhaps it may be regretted that more space was not allotted to this division of the subject, to the end that certain affections might have been more fully discussed, yet brief as it is, Mr. Treves' article maintains the high standard of the "International Encyclopædia," and in common with all the contributions from the other side of the Atlantic, is the more welcome in that it shows that the encyclopædia is in fact as well as in name "International."

P. S. CONNER.

Article III. INJURIES AND DISEASES OF THE EYES AND THEIR APPENDAGES. By E. WILLIAMS, M.D., Professor of Ophthalmology in Miami Medical College, Cincinnati.

Article IV. INJURIES AND DISEASES OF THE EAR. By ALBERT H. BUCK, M.D., of New York.

III. This contribution is replete with ophthalmological wisdom and wit, and it would be difficult to find anywhere within the same compass a more valuable contribution to the subject. Dr. W. is one of the Nestors of American ophthalmology, and has an immense clinical experience, extending over many years, from which he has drawn appropriate cases to illustrate every point touched upon. He is master of a vigorous style, and shows an intimate acquaintance with the literature of the subject.

The article begins, after a brief preface, with a clear, bold outline of the anatomy of the parts, showing a familiarity with the results of the most modern investigations. Frequent practical connections of anatomical with the facts of clinical surgery, illustrated by pertinent cases drawn largely from his own experience, are shown on almost every page. The wood cuts illustrating this part of the subject, clear and well selected, are borrowed (with due credit), mostly from Merkel and Gerlach.

The section on optical defects dependent upon anatomical peculiarities of the eye, while excellent so far as it goes, and full of terse, epigrammatic sentences, seems too brief even for such an encyclopedia article, considering the fact that this part of the subject is the basis of modern ophthalmology. A little space could well have been spared from other sections to illustrate this more fully and with the aid of a few diagrams. The author prefers the ophthalmoscope for determining refraction, and relies on an 8-grain solution of homatropine for relaxing accommodation.

The section on "Diagnosis of Ocular Affections without the use of the Ophthalmoscope," is full of practical common sense points. The first few sentences of it deserve quotation: "Medical men often talk flippantly about the use of the ophthalmoscope, flourishing the instrument before the dazed eyes of their patients, seeing *nothing*, and not even knowing how to interpret *that*. * * * * How few students ever look through it with discrimination? A few weeks of special instruction by a competent teacher will alone enable the student to *begin* the intelligent employment of it in diagnosis. But daily and persevering use of this, or any other instrument of precision, is required to give it serious importance."

In the sections on diseases and injuries, and tumors of the orbit, in-

teresting cases from the author's record book are narrated. (The one on page 195, in which a bony growth was extracted by strong forceps, is specially noteworthy. Also the case of vascular tumor of orbit, cured by ligation of both carotids.) The subject of injuries of the eyeball is also well illustrated by cases drawn from his own experience.

The subject of sympathetic ophthalmia is clearly discussed. He would warn against the extreme theory that *every* blind eye ought to be enucleated, but would still emphasize the fact that *any* blind eye *may* at any time become a source of danger. He stops hemorrhage, after enucleation, by pressing with the finger firmly against the apex of the orbit, and advises against the use of sponge, cotton, or anything but the finger, for this purpose.

In the treatment of diseases of the conjunctiva, nitrate of silver is a favorite remedy with Dr. Williams. He prefers the weak solution, and does not often use stronger than ten grains to the ounce. In obstinate cases he believes in alternating the use of this agent with sulphate of copper in solution, or crystal, and a saturated solution of neutral acetate of lead—washing the parts freely with water after application. Mercurial ointments of different kinds, which are so highly thought of by many surgeons in treatment of conjunctivitis, he thinks "are of no value in most cases, and positively injurious in many."

He recommends, in case of some obstinate forms of granular lids, in which the acino-tubular glands along the back edge of the tarsus are engorged with a sort of gelatinous substance, that this be pressed out by the thumb nails, one sliding behind and the other in front along the whole length of the tarsus. This thoroughly done two or three times, at intervals of a day or two, he says very much expedites the process of cure.

He barely alludes to the use of jecquirity in treatment of intractable cases of granular lids with pannus, which most ophthalmic surgeons now consider a safer and more efficient remedy than inoculation by gonorrhœa pus which receives very favorable notice from him. He speaks well also of the use of finely powdered sulphate of copper in these cases, applied to the external lids, once or twice a week, and of the perchlorides of iron and eserine.

In purulent conjunctivitis, in its various forms, both in infants and adults, he relies most on weak solutions of nitrate of silver, and thinks the use of a two-percent solution twice a day for the first day or two after birth, is a wise precaution against ophthalmia neonatorum.

In the treatment of rapidly-spreading ulcers of the cornea, he praises very much the efficiency of carbolic acid, applied on a wooden tooth-pick along the necrotic edges, and repeated once or twice a day. This

may be used in connection with simple paracentesis, or Saemisch's incision of the cornea, with great effect. He favors the use of atropin rather than eserin in those cases.

In the treatment of iritis he prefers the natural to the artificial leeching or wet cupping of the temples, and recommends warm poulticing in obstinate cases—particularly where there is a tendency to glaucomatous tension.

He advises iridectomy in cases where there are extensive synechiæ, and warns against delaying this where the pupil is occluded and the periphery of the iris is bulged forward. He prefers the use of a Græfe's to a spear knife in these cases.

On the subject of cataract operations, Dr. Williams shows a wise and conscientious conservatism, advising against operation if one eye remains good—against simultaneous operations on both eyes at one time, and against an operation on the second eye where a successful result has been obtained with the first—instancing cases in which sympathetic ophthalmia had been set up by a second operation with total loss of vision. He well says: "Surgeons and physicians generally have very trivial notions of the delicacy and seriousness of cataract operations—an opinion which is confirmed by the publication of successful cases *only*, as personal advertisements rather than in the interest of the healing art."

On the subject of glaucoma nothing new is presented, though a perfect familiarity with the literature pertaining to it is shown, and his own views are practical and common sense.

The difficult subject of muscular troubles of the eye, including strabismus, is well handled, and he shows here, as all through the work, full acquaintance with the best authorities, practical common sense, and the wise conservatism resulting from a long experience. He advises operating on but one eye at a time in convergent strabismus, except in very marked cases, and to delay second operations in hope of slight remaining deviations being corrected with time, and for fear of subsequent insufficiency of the severed muscle and unsightly divergence in after years. He is an advocate of advancement instead of simple tenotomy in many cases.

The concluding section, on ophthalmoscopic diseases, like that on errors of refraction, seems too short for even the briefest outline of ophthalmic surgery, occupying less than three pages. The six colored figures illustrating this part of the subject are not executed in the best possible manner.

IV. The article on Injuries and Diseases of the Ear is a well-digested summary of some of the most important facts of modern otology,

illustrated by frequent reference to the author's own observation and experience. He is an independent observer, and often differs in his opinions from those generally received. Sections are devoted to Methods of Examination, Diseases of the Auricle, External Auditory Canal, and Middle Ear. He then takes up the consideration of Diseases of the Mastoid Process. This subject is a favorite with the author, and one to which he has previously made valuable contributions. It is a very important one also, for the question of life or death is often involved in the prompt recognition and bold treatment of mastoid complications. He recognizes three types of mastoid disease, viz: (1.) Subacute, condensing mastoid osteitis, termed also sclerosis or hyperostosis of the mastoid process, and the recognition of which type he ascribes to the writings of Dr. John Green, of Boston; (2.) Acute diffuse mastoid osteitis; (3.) Chronic ulcerative inflammation of the mastoid antrum. In the first class of cases, characterized by a gradual filling up of the mastoid cells with bone substance, the result of protracted subacute inflammation of their lining membrane, he recommends perforation of the bone, with the drill carried to a depth of half an inch, when there is pain unrelieved by hot poultices, leeches, or Wilde's incision. He does not consider it necessary in these cases to reach the antrum, as the relief depends not upon making an outlet for pent up secretions, but upon the derivative effects of the wound in the bone.

In acute mastoiditis, when hot poulticing, leeching and a free Wilde's incision have failed to relieve the pain, he advises a broad opening, carried on at least to some of the cells, though not necessarily to the antrum. He uses a drill with its cutting edges turned in opposite directions. He never carries it beyond twenty millimetres. He uses at first a five-percent solution of carbolic acid to syringe out the opening made, and a warm saturated solution of boracic acid.

In his third class of mastoid cases, or chronic ulcerative inflammation of the mastoid antrum, the chief characteristics are an accumulation of caseous matter in the antrum, and ulceration of its walls resulting in whatever direction least resistance is met with. This form of mastoiditis furnishes the largest number of fatal cases. The only effective treatment, he considers, is free opening into the mastoid antrum so as to give every outlet to the accumulated secretion. As a rule, he thinks temperature may be taken as a measure of the activity of the disease in the mastoid. Delirium does not necessarily indicate a fatal issue. Coma and strabismus are more grave symptoms.

The section on fractures of the temporal bone is very interesting. In regard to the diagnostic significance of hemorrhages and watery

discharges from the ear in cases of injury, he differs from many surgical authorities. He thinks the hemorrhage, as a rule, comes from ruptured vessels in the vicinity of Shrapnell's membrane, and does not necessarily indicate fracture extending through the pars petrosa; and also that there may be fracture of the temporal bone without the slightest bleeding from the external auditory canal.

Neither does he consider a watery discharge from the ear after injury as necessarily indicative of fracture of the petrous bone, for he believes that this may come mostly or entirely from the middle ear, and be followed by recovery, as he has seen in several cases.

The concluding section, on affections of the auditory nerve, is very brief, as the author regards our knowledge of the subject very scanty.

A. MATTHEWSON.

Article V. DISEASES AND INJURIES OF THE NOSE AND ITS ACCESSORY SINUSES. By GEORGE M. LEFFERTS, M.A., M.D., Clinical Professor of Laryngoscopy and Diseases of the Throat in the College of Physicians and Surgeons, New York, etc.

The value of the article on Diseases and Injuries of the Nose and its accessory Sinuses, by Professor Lefferts, can not fail to be appreciated by the reader, whether specialist or general practitioner. It is clear and terse in style, yet very complete. The nomenclature, while differentiating the diseases perfectly, is made as simple as possible, and is in accordance with our present knowledge of the subject. The same clearness and simplicity characterizes the pathology. The author, with good taste, has avoided the discussion of the individual theories and hypothetical points which burden so many of our writings which are intended to be practical, and has given us the certainties and facts in the pathology of the subject in a few words.

The various instruments and methods of treatment are considered at greater length. The newer methods of instrumental procedure are fully explained, and some of them, as well as some of the older ones, are condemned. The dangers, disadvantages and inefficiency of the nasal douche (that instrument which is to be looked upon only as a relic, and yet which is prescribed too often by the practitioner as an easy way of disposing of the case of catarrh which he does not care to treat scientifically) are strongly alluded to, and attention directed to the various atomizers and other and more perfect methods of cleansing the nasal passages, which should supersede it. In this connection, the necessity of thoroughly cleansing the mucous membrane, as the first step in any local treatment, is also brought prominently before the reader.

The galvano-cautery receives, if anything, less than its share of attention. The certainty of its action, the radical cure of the forms of nasal stenosis consequent upon hypertrophy of the mucous membrane, the quick and often brilliant results which may be obtained by this instrument, entitle it to perhaps the first place among all procedures for the reduction and removal of superabundant tissue, especially in the nose. The different forms of the instrument, however, are discussed at length, and the directions for its use are full and explicit. To the statement made by the author, that its use is attended, under the proper conditions, by a very slight amount of pain, might now be added, that under the influence of our new local anæsthetic there is absolutely no pain. The use of the hydrochloride of cocaine in dealing with mucous surfaces is of great advantage in nasal as well as ophthalmic surgery, and it is unfortunate that the work was complete before the recent developments on the subject, or the author would undoubtedly have contributed many valuable hints as to its action in this special field.

The pernicious effects of mouth breathing, as a result of both nasal stenosis and pharyngeal obstruction, and its influence on other portions of the respiratory tract, are not discussed as fully as by some writers, while the subject is certainly worthy of more than passing mention. The necessity of removing an excessive amount of adenoid tissue in the vault of the pharynx, by radical medicinal measures or surgical interference, and several of the methods employed, are spoken of. The simple and available method suggested by Cohen, of passing the index finger up behind the soft palate and using the sharp nail as a curette, is not referred to. The method has been successful with others beside Cohen, and deserves mention.

That most intractable disease, post-nasal catarrh, receives a thorough and scientific handling, but the author does not throw much new light upon the subject of its treatment. Each new treatise on this disease only tends to strengthen the conviction that the results are in too many cases very discouraging. The importance of differentiating the causes which give rise to the affection is dwelt upon, and undoubtedly this is absolutely necessary to secure any certainty of success.

The article treats quite fully of the reflex disturbances produced by nasal obstructions such as stenosis, polypi and inflammatory swelling of the mucous membrane. That reflex coughs, dyspnœa and asthmatic attacks are more frequently caused by a nerve irritation in the nares, than we are aware of, is a subject to which the attention of the specialist is often called, and which fully deserves all the space devoted to it. The author gives us some very interesting information which

may be considered with profit. The reference to hay fever seems incomplete, and should we not read the entire article, we would be disappointed in not finding some new information; at the end, however, is a note, which possibly might have been better introduced at the bottom of the same page, referring to a very good list of articles on this interesting subject, comprising the result of the latest investigations.

While, on the whole, the subject of treatment does not give us many new ideas, yet, perhaps, there has not been as great progress since the later works on the subject, as in some other departments of medicine. Throughout the entire article the opinions of many prominent specialists are given, and the reader obtains a very exact idea of the present status of our knowledge of the treatment, both medical and surgical, of the nasal passages. It is to be regretted that the author has refrained from giving us more of his own experience in this matter, though by his indorsement or condemnation of methods employed by others the reader may be safely guided.

C. E. DELAVERGNE.

Article VI. INJURIES AND DISEASES OF THE FACE, CHEEKS, AND LIPS.

By ALFRED C. POST, M.D., LL.D., Emeritus Professor of Clinical Surgery in the University of the City of New York.

Article VII. INJURIES AND DISEASES OF THE MOUTH, FAUCES, TONGUE, PALATE, AND JAWS. By CHRISTOPHER HEATH, F.R.C.S., Holme Professor of Clinical Surgery in University College, London, and Surgeon to University College Hospital.

VI. In discussing badly lacerated or contused wounds of the face which have been followed by unsightly depressed cicatrices, occasioned by adhesion of the skin to bone or periosteum, the author recommends the operation of Mr. Wm. Adams. This very ingenious procedure consists in the free subcutaneous division of the constricting band followed by the elevation of the cicatrix above the level of the surrounding skin, by two hare-lip pins crossing each other at right angles, and maintained in this position for three days. After a few paragraphs on facial paralysis and salivary fistula, a page and a half is devoted to facial neuralgia. Its medicinal treatment is considered with some detail, but is necessarily a catalogue of therapeutic resources, and no opinion is expressed as to relative values. In considering operative measures the mere division of the nerve is properly condemned as useless. Excision of a considerable portion yields better results, but many times the cure is not permanent. The statement is made that the operation is often unsuccessful because the nerve is not excised sufficiently near to

its origin. Carnochan's operation is described. This procedure has been repeated by a number of surgeons, with various modifications and varying degrees of success. Nerve-stretching is referred to as a substitute and the results have been measurably good. Burns and frost-bites of the cheeks and lips next receive brief mention. In speaking of facial erysipelas no mention is made of naphthaline, which has the repute of being almost a specific in this disease. Meningitis is mentioned as a sequence of facial erysipelas. Modern investigators have failed to show such lesions even when the ante-mortem symptoms were considered almost pathognomonic. Under malformations and deformities of the lips and cheeks, harelip receives due notice, and is well illustrated. To prevent the formation of a notch at the vermillion border, the method of Malgaigne, called by Agnew the method of Collis, is favorably mentioned. In cases of simple harelip, whether single or double, the author recommends operation about three or four months after birth. In cases of complicated harelip, whether accompanied with maxillary projection, or fissure of the alveolar portion of the jaw, and of the bony palate, the performance of rectification is advised when the child is three or four weeks old. If the surgeon is not consulted until the patient is five or six months of age, he prefers to postpone operative measures until the first dentition is completed. Wounds of the lips, furuncle and carbuncle of the lips, ulcers, including lupus, rodent ulcer, and epithelioma receive brief mention. The prognosis of very early operations in cancer of the lip is declared to be favorable, either for radical cure or at least a long reprieve. In considering port-wine marks, Balmanno Squire's method of linear scarification is apparently approved by the fact of an essentially full description of its technique being inserted. Cysts and tumors of the lips, and hirsuties obtain short descriptive paragraphs. Sixteen pages comprise the space devoted to the foregoing subjects. The remaining portion of the monograph, and the portion upon which most labor seems to have been expended—embracing eighteen or nineteen pages, deals with cheiloplastic operations. This part is profusely illustrated with good and well chosen diagrams of various operations, and their modifications, required for special deformities. In detailing the steps of each operative procedure the writer's extensive experience does good service in rendering the descriptions clear and intelligible. As a whole the section is characterized by conservatism and practicality—space and subject not allowing an excursion into the region of controversial pathology. It is an eminently useful contribution to the needs of the working surgeon.

VII. In the early part of the article by Mr. Heath, injuries of the

mouth and fauces receive brief notice. Following comes a complete but very condensed description of the various diseases of the mouth and fauces, principally inflammatory, the rare tumors of tonsils and pharynx not being omitted. Diseases of the tongue are quite fully elaborated, together with the methods of operation. Where portions of the tongue are to be removed for cancer, the cold wire *écraseur* is preferred, isolating the growth by means of needles. The galvano and thermocauteries are disapproved on account of the occurrence of secondary hemorrhage. Where the entire tongue is to be removed Nunneley's method of applying the *écraseur* is approved. The prognosis is not very favorable, but the author recommends operation when it is likely to diminish pain and improve nutrition.

Malformations and diseases of the palate form the next important division. In discussing uranoplasty, it is stated that the necrosis and exfoliation which follows the detachment of the bony edge of the hard palate, is so great as to render it an unfavorable expedient. Credit is given to Kingsley for his artificial palate with which Heath has seen some remarkable results, but the author now prefers an improved device by Swersen, of Berlin. Three pages are allotted to diseases of the gums. In epithelioma of these structures it is recommended that the surgeon be not content with removing the alveolus, but that he should resect a piece of the whole thickness of the jaw, well beyond the disease. Diseases and tumors of the jaws are quite fully discussed. Operative measures and their various modifications, with three pages on closure of the jaws and its treatment, complete the contribution. As a whole it is a complete and systematic treatise on the subjects of its title. Although necessarily brief, it would be difficult to find any form of disease of these parts of the body which has not received at least a few words of mention.

G. R. BUTLER.

Article VIII. SURGERY OF THE TEETH AND ADJACENT PARTS. By NORMAN W. KINGSLEY, M.D.S., D.D.S., late Professor of Dental Art and Mechanism in the New York College of Dentistry.

The subjects which are treated of in this contribution include the *Extraction of Teeth*, the regulation of *Irregularities of the Teeth*, *Dental Caries*, *Toothache*, *Alveolar Abscess*, *Cystic Tumors of the Jaws*, *Artificial Dentures*, and the *Mechanical Treatment of Lesions of the Palate*. The author is very concise, yet very clear, in his statements, and one rises from a perusal of the few pages that have been devoted to this subject with a decided sense of satisfaction.

In the matter of dental caries, the author clearly defines the important relation of constitutional conditions as predisposing influences

that lead to local decay. The sole local cause of decay he states to be external agents of an acid character, chiefly those produced in the mouth by fermentation. The micro organisms, which he admits to be always present in carious dentine, he asserts to be merely the incidents of the decay, overlooking apparently their unquestionable agency in determining the formation of irritating and corrosive products in the substances that afford them pabulum. The process of progressive molecular necrosis that constitutes caries is surely something more than a mere chemical solution of lime salts that Dr. Kingsley describes it to consist in. With much greater probability of truth could this be the cause of that more rare form of dental destruction, described in the succeeding paragraph, which shows itself in a general wasting of the buccal or labial surfaces of the teeth, sometimes forming great horizontal groves near the gum, with clean polished surfaces, and with no trace of decomposed dentine, and which pursues its course unaffected by the usual treatment applicable to circumscribed caries.

In the portion devoted to the discussion of the mechanical treatment of lesions of the palate, is to be found that part of the contribution which has the greatest originality and value. He condemns *in toto* the operation of staphyloraphy. He says it is impossible to correct by surgery the defects of speech arising from a fissured palate. This failure, he says, has not been from the inability of the surgeon to bring the edges of the divided velum together and unite them, but lies in the fact that the newly formed palate is always too short, that its posterior edge does not and cannot be made to reach the pharynx, and that, hence, the speech will necessarily be defective, in spite of the operation, save in some extraordinary cases. A successful operation, surgically considered, has often been not only valueless but productive of positive harm. The new velum becomes a rigid curtain which splits the column of sound in its upward ascent, and renders it less manageable than it was before. The author advocates the substitution, in all cases, for staphyloraphy of some form of artificial apparatus to supply the defect. The benefit to be derived from the use of an artificial palate depends upon the intellectual status, the application, and the perseverance of the patient. The improvement is sometimes rapid and remarkable; in other cases slow and tedious. The result must be accomplished by the same character of attention and training as would be given by an adult to the mastery of a foreign language, or of a musical instrument. There is no limit to the age during which such instruments may be introduced. The author recommends, however, that as a general rule the eruption of the twelfth-year molars be the signal for the introduction of the apparatus.

L. S. PILCHER.

CHRONIC PERI-UTERINE ABSCESS AND ITS TREATMENT BY LAPAROTOMY.¹

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OF CHICAGO.

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A PERI-UTERINE abscess of the broad ligament or parametritic abscess, is the result of an inflammation in the connective tissue surrounding the uterus. This inflammation is always caused by invasion of septic material from an injured place in the mucous membrane of the female genital tract. A septic lymphangitis (Mundé²), or phlebitis will here, as anywhere else in the body, be the initial stage. If this septic invasion happen to strike a pre-formed uterine hæmatocele, it finds fertile soil for development, and consequent transformation of the hæmatocele into an abscess. If there is no pre-formed hæmatocele then the loose connective tissue of the lateral ligament (where an œdema may be easily developed with its exudation of serous fluid), furnishes a soil as well adapted to the cultivation of the septic microbes as the blood in the hæmatocele. Both this serous exudate and blood of the hæmatocele give the same facilities for development as the fluids in the glasses in the experimental laboratories.

The parametritis of Virchow or pelvic cellulitis of Barnes is consequently of very common occurrence, and although this inflammation takes a light and benignant course in the majority of cases, yet it may lead to the most grave and difficult cases with which the surgeon has to deal. I have never seen this better expressed than in the words of Emmet, who says:⁴ "I

¹ Read before the Gynæcological Section of the American Medical Association, 1885.

² American Journal of Obstetrics, Oct., 1883, p. 1009.

³ Clinical History of the Medical and Surgical Diseases of Women, London, 1873.

⁴ Principles and Practice of Gynæcology, p. 258.

do not exaggerate when I claim that pelvic cellulitis is by far the most important form of pelvic inflammation with which woman is afflicted."

This suppurating parametritis, whether connected with the puerperium or not, may, like lymphangitis or phlebitis in other parts of the body, lead to the formation of abscesses not only at the point of invasion, but also in more remote parts, probably from suppurating lymph glands. Only in this way can we account for the fact that in a number of the parametritides, especially in those connected with the puerperium, the abscess often forms in the loose retro-peritoneal tissue of the iliac fossa, and can be opened by an extra-peritoneal operation, either at Poupart's ligament or at any place along the brim of the pelvis. This form of suppuration takes, almost always, an acute course, while, if the abscess is formed in the uterine half of the broad ligament, or in the antero, or retro-uterine connective tissue, it is more apt to take a chronic course as a considerable thickening of the connective tissue surrounding the pus, is apt to take place, and, so to speak, encapsulates the abscess.

I shall limit my remarks to the latter form of pelvic abscess, in the locality immediately surrounding the uterus, where Sinety¹ describes his "inflammation circum-uterine proprement dite."

An abscess in this place is apt to perforate into the rectum or bladder, or into some part of the genital tract, usually into the vagina.

In a number of cases, the evacuation of the abscess, whether spontaneous or artificial, will be followed by retraction of the abscess wall, and cure; but there remain some cases in which the abscess does not close. Whether insufficient outlet or invasion of new septic material from the perforation opening, causes the abscess to continue, is immaterial; the fact remains that a number of such cases exist, and that if not overcome by surgical treatment, the patient's life will slowly but surely be destroyed in one of the following ways:² The continued sep-

¹ *Progrès Médicale*, 31, 32, 1882, Virchow-Hirsch Jahresbericht, 1883, Band. 2, Abth. 3, p. 530.

² Schröder, *Krankheiten der weiblichen Geschlechtsorgane*, Ziemssens Handbuch der speciellen Pathologie und Therapie, part 29-30, p. 436.

tic inflammation in the cavity will cause chronic septicæmia and destroy life under the symptoms of so-called hectic fever;¹ amyloid degeneration of the spleen, kidneys, and liver, will cause the patient to die under the symptoms of hydrops and uræmia;¹ more rarely, it may be, according to the general opinion of authors (Schröder and others), that a tuberculosis will develop secondarily in the abscess wall (I am more inclined to believe, however, that such an abscess is a tuberculosis from the beginning)¹; finally an acute gangrenous septic inflammation may set in in the cavity and cause death in a very short time under the symptoms of an acute typhoid condition.

Considering the grave prognosis of chronic peri-uterine abscess, whether it has an outlet or not, we are justified in resorting to even the most serious surgical procedures to prevent the otherwise certain fatal termination.

There are two ways in which such an abscess may be attacked with a view to effect free opening, drainage and washing out from the vagina or from above the pubes, with or without opening the abdominal cavity.

Schröder² advocates the operation through the vagina even in cases where the abscess does not point in this direction, and where it has opened into the rectum; he cuts through the vagina in the lacunar, and dissects up along the uterus, keeping close to the latter, until the abscess is reached.

From above the pubes the abscess can be reached when it has perforated into the bladder, by opening into the latter by the *sectio alta* (as performed by Schröder).³

In the rather rare cases in which an ante-uterine abscess has pressed the pubic fold of the peritoneum upward toward the umbilicus, the abscess can be reached by an incision in the median line above the bladder.

The most important and effectual operation for chronic peri-uterine abscess, namely, attacking the abscess through the abdominal cavity by means of laparotomy, we owe to Lawson

¹ Schröder, *Krankheiten der weiblichen Geschlechtsorgane*, Ziemssens Handbuch der speciellen Pathologie und Therapie, part 29-30, p. 436.

² *Zeitschrift für Geb. und Gyn.* Bd. 8, p. 120-121: Virchow-Hirsch Jahresbericht Bd. 2, Abth. 3, p. 530.

³ *Op. cit.*

Tait.³ Occasionally in former years it happened that a large peri-uterine abscess, that had been mistaken for an ovarian tumor or a uterine fibroid, was cut down upon by laparotomy, opened and evacuated, and as extirpation of the sac, as a matter of course, was an impossibility, the walls of the sac were united with the abdominal wound, and quite a number of these cases recovered. But Lawson Tait has the merit of being the first man, who, with full knowledge of the diagnosis, systematically made use of laparotomy to bring such cases to a successful termination, and he is able now, in 1885, to report as many as thirty cases of such operations without a single death.²

Before attempting to discuss the relative value of the different operations mentioned above, and before entering into the details of the operative procedure, I shall report the following three cases of chronic peri-uterine abscess communicating with the rectum, which have come under my observation during the last two years, and which I have treated by laparotomy:

CASE I. Chronic tuberculosis of right broad ligament—Tuberculous abscess communicating with rectum, of nine months' standing—Intermittent discharges through the rectum, and intermittent attacks of fever—Great emaciation—Laparotomy—Sac united with abdominal wound—Two ounces of tuberculous tissue removed from cavity—Remainder of tuberculous contents destroyed by caustic potash—Recovery from operation—Small recto-abdominal fistula remaining—Death sixteen months later, under symptoms of chronic ulcerating tuberculosis of intestinal canal—No autopsy.

In March, 1883, I was called by Dr. T. S. Bidwell to see Mrs. O. I am indebted to Dr. Bidwell for the following previous history of the case:

The patient is 27 years of age. She was married in 1879. Six months later she had an attack of what seemed to be severe pelvic cellulitis, which lasted for several weeks, but subsided under rest and treatment. On examination at this time, the uterus was found to be fixed, painful to the touch, as if bound down by adhesions, and a little lower down than normal. The uterus remained immovable after the subsidence of the cellulitis. In July, 1880, she was taken with bowel

³ Pathology and Treatment of Diseases of the Ovaries, 1883, p. 344.

² Medical Record, Jan. 3, 1885, p. 1.

and stomach trouble, with severe pain in the inguinal regions, vomiting and diarrhoea, which lasted for several weeks. She was fairly well during 1881 and the spring of 1882. In the latter part of 1882, however, she had considerable severe pain in the bowels, followed by a discharge of pus from the rectum.

On examination, a tumor was found in the abdomen, a little to the right of the median line, just below the umbilicus. The tumor was about the size of the fist, hard, immovable, painful on pressure. It was supposed that the patient was suffering from pelvic cellulitis, and that a pelvic abscess had been formed which had opened into the rectum. On rectal examination, however, no opening could be found. The discharge of pus from the rectum has continued, from time to time, until now. During the winter of 1882, she had a severe fit of sickness, resembling typhoid, with morning and evening temperature, pains in the abdomen, diarrhoea, and discharge of pus from the rectum, from which she recovered in about three weeks.

On examination, I found the patient considerably emaciated; pulse, 100; temperature, 101°. She complained of pains in the lower part of the abdomen when walking, and stated that once in every two or three weeks the pain increased, accompanied by more fever than usual, and, after this condition had lasted for about a week, there would be a considerable discharge of pus from the rectum, followed by relief from the pain and fever. Heart and lungs, normal; abdomen not enlarged. In suprapubic region was an immovable tumor, about the size of the fist, in the median line, extending a little farther to the right than to the left side. On vaginal examination, I found the uterus immovable, the vaginal portion pressed to the left side, and firmly connected with a hard tumor in the region of the right broad ligament. It was impossible exactly to define the limits of the uterus, as it formed with the tumor one immovable mass. On rectal examination, the tumor could be felt to the right of and behind the vaginal portion, but no perforation opening into the rectum could be reached. The patient complained of constant diarrhoea, accompanied by griping pains preceding defecation.

Diagnosis.—Peri-uterine abscess in right broad ligament, communicating with rectum. As there was no place in the vagina where any soft part, or anything like fluctuation, could be felt, I decided to perform laparotomy, with a view of draining the abscess, and, if possible, closing up the cavity.

July 10, assisted by Drs. Bidwell, Lachmann, Verity, and others, I proceeded to the operation. After the usual preparations for laparotomy, the patient was anæsthetized, and an incision made in the me-

dian line, from an inch above the symphysis to two inches below the umbilicus. When the peritoneal cavity had been opened, a round, red tumor, covered with peritoneum, presented itself in the median line. It was three inches broad, three inches high, and was surrounded by closely adherent intestines and omentum; hard to the touch, having no fluctuating or soft parts. The fallopian tubes and the ovaries could be neither felt nor seen, and a gynecologist present stated, as his opinion, that the tumor was an enlarged uterus, and that there was no abscess. The needle of a hypodermic syringe was introduced in several places, but blood, and no pus, was withdrawn into the syringe. Having thus failed to find the abscess, I endeavored, by moving the needle in various directions, to find a cavity, empty, of course, but in which I could move the needle around. Finally I thought I had discovered such a cavity, and so cut in on the needle. The knife passed through a thick layer of firm, elastic, connective tissue, and finally penetrated a cavity, from which a few drops of grayish pus came out. When this opening had been dilated sufficiently to admit the finger, I could feel a cavity filled with a cauliflower-like mass of friable tissue, in the midst of which was a canal; through this canal the finger passed down into the rectum, meeting the finger of one of the gentlemen present, which had been introduced through the anus. I then enlarged the opening, and saw a large cavity filled with irregular masses of friable, grayish-red tissue, bleeding only a little on pressure, and resembling the irregular surface of a sarcomatous tumor. I really considered the case to be one of malignant tumor, and that its entire removal was impossible. At the same time, I decided to scrape out as much of this mass as I conveniently could, and so removed, with the sharp spoon, about two ounces of the grayish, somewhat friable substance. The cavity then presented rather grayish walls, from which there was only slight hemorrhage, and at the bottom of which was seen an opening, sufficient for the passage of two fingers, leading to the rectum.

The walls of the cavity were disinfected with ten per cent. solution of chloride of zinc; the walls of the sac united with the lower end of the abdominal wound by means of a double row of sutures, and the remainder of the abdominal wound closed. A heavy drainage-tube was inserted into the cavity, and the cavity around the tube packed with iodoform gauze. A heavy antiseptic dressing was now applied, and the patient brought to bed—the operation having lasted two hours and a half.

At this time, as I considered the case one of malignant tumor, and consequently hopeless, my only aim was to have the patient recover

from the effects of the operation, as I did not believe that any further treatment would be called for.

11th. The patient has passed a rather comfortable night. Pulse, 114; temperature, 98°. The dressings, when removed, are found soiled with liquid fæces, all over the abdominal wound, which was cleaned, powdered with iodoform, and redressed. Over the os sacrum is a decubitus eschar, the size of a dollar.

Concerning the rest of the after treatment, it is sufficient to say that the dressings each day were found soiled with liquid fæces. The abdominal wound healed without suppuration, and without any disturbance whatever from the side of the peritoneal cavity. A microscopical examination of the cauliflower-like tissue, removed, demonstrated, contrary to my expectations, that this tissue was not a sarcoma, but conglomerate masses of miliary tubercles. The disease, thus being proven a local tuberculosis, and consequently not necessarily fatal, made it important to attempt to destroy all the tuberculous tissue, so that the cavity might finally close up. To effect this, the following plan of local treatment was carried out: Once every day, or every two days, the mass of grayish tissue was cauterized, by Dr. Bidwell, with caustic potash. After this had been done for about two weeks, the cavity was cleared of its contents and commenced to retract, and bimanual examination showed that not more of the hard mass remained than what would correspond to a slightly enlarged uterus.

On the tenth day, the sutures of the abdominal wound were removed. In the third week, the patient was able to sit up in bed, and, a week later, could sit up in a chair—the bedsore over the sacrum being the only obstacle in the way of her recovery from the operation. The drainage-tube in the cavity was now removed. From the fistulous opening, a small amount of fæcal matter would still come, especially when the bowels were loose. In the sixth week, she was able to walk around, had a good appetite, and became daily stronger, but the bedsore did not entirely heal up until about three months after the operation.

The patient's condition remained about the same from this time on. She suffered from diarrhœa and pain in the intestines all the time. About twelve months after the operation, the pain and diarrhœa became more severe, the patient's emaciation increased, and four months later she died. No autopsy was made.

It is impossible for me to state whether this tuberculous abscess cavity was a tuberculosis developed in the fallopian tube, or in a peri-uterine abscess outside of the tube. That the tissue removed from the abscess was a conglomeration of

miliary tubercles was easily enough demonstrated by the microscope; but in most of these cases, as far as my experience goes, the tubes and ovaries are matted together with the uterus and adjacent intestines into one mass, in which it is impossible to distinguish the different organs,—in many cases even to determine which is the uterus and which the cavity, before the latter has been cut into. But tuberculosis of the tubes is much more common than tuberculosis of an extra-tubal pelvic abscess wall, as we know that the mucous membrane of the uterus and tubes is quite commonly the starting point of infiltrating tuberculosis.

In cases of this kind we cannot, of course, expect the operation to be a radical cure, as it is almost impossible to remove all the tuberculous tissue. Even if this could be accomplished, we know that of the patients with local tuberculosis, even if successfully operated upon, a large percentage (in local tuberculosis of the joints, twenty-five per cent.) will succumb sooner or later to either acute or chronic general tuberculosis of the internal organs. That this patient died sixteen months after the operation, from intestinal tuberculosis, there can be very little doubt, although no autopsy was made, as she suffered all the time from chronic diarrhoea with pain in the intestines and increasing emaciation, with no symptoms of serious disease either of the kidneys or of the organs of the thoracic cavity.

This was an unusual form of infiltrated tuberculosis, one that I had never before seen, as there was no cheesy matter in the abscess cavity, but it was filled with a voluminous proliferating mass of grayish red living tissue, resembling rather a cauliflower form of carcinoma or sarcoma than tuberculosis.

The rapid formation of a large bed-sore proved that the patient was already in an extremely exhausted condition from the chronic septic fever. A rather remarkable feature in the course of the after-treatment was, that the abdominal wound healed by first intention, notwithstanding that from the very day of the operation it was continually covered with faecal matter. I believe that the treatment of the wound with iodoform protected it against the faeces.

The necessity of early operation before a chronic abscess of this kind has had time to cause amyloid degeneration of the

internal organs, and so to frustrate any surgical effort at a cure, is well illustrated by the following case :

CASE II.—Chronic peri-uterine abscess in left broad ligament, communicating with rectum, of more than a year's standing—Intermittent discharge through rectum—Chronic septicæmia, albuminuria, commencing anasarca—Laparotomy, with union of sac to abdominal wound—Re-opening of abdominal wound, and evacuation of four ounces bloody serum—Death, nine days after operation, from uræmia—Autopsy—Amyloid degeneration of spleen and kidneys.

Margaret Robinson, 38 years of age, domestic, entered Cook County Hospital September 12, 1884. Family history good. Parents died in old age. Patient was married in 1872. Since that time has been troubled with uterine disease, but was otherwise healthy. Her menstrual periods commenced at 15 and have been always regular, recurring every three weeks, but the flow has been always large and painful. She has never had any children or miscarriages. Her present disease began in June, 1883, with pain in the supra-pubic region, and fever, so that she was obliged to remain in bed for several weeks, after which a sudden discharge of pus through the rectum partially relieved the pain. She was told by her doctor that she had a pelvic abscess which had broken into the rectum. She soon was able to be up and around, but was unable to do any work because of the pain and discharge of pus through the rectum, sometimes continual, sometimes intermittent, which would result from any such attempt.

During the last year she has grown weaker, and a month ago her feet began to swell at the ankles. Since this time the pain over the symphysis and os sacrum has been almost constant; the passages from the bowels have caused pain high up in the rectum; she has had fever almost every day, and occasional chills and headache. Her appetite is poor, and she has grown weaker every day. Pulse, 120; temperature, 102.6°. Ordered quinine; rectum to be washed out daily with lukewarm water.

13th. A.M. Pulse, 102; temperature, 101.2°. P.M. Pulse, 138; temperature, 103.5°. On examination we find patient pale, not extremely emaciated; slight œdema round the ankles; heart and lungs normal. Vaginal examination shows the uterus pressed forward and to the right, immovable. In left lateral ligament is a hard swelling close to the side of the uterus, and somewhat tender on pressure. In the supra-pubic region is a hard swelling three inches broad, extending to midway between the symphysis and umbilicus. Digital exploration through the rectum shows the tumor high up and to the left of the

uterus. As high up as the finger can reach—that is, three or four inches above the anus—can be felt a hard, nodulated place in the rectum, which is probably the perforating opening surrounded by granulations. Urine acid, amber colored, containing some albumen and casts.

Diagnosis. Abscess in left broad ligament, communicating with the rectum. Commencing septicæmia, albuminuria, and anasarca.

It was decided to open the abscess by laparotomy.

16th. 10.30 A.M. Assisted by Drs. Guerin, Jacobson, Murphy, Verity, and Randall, of the hospital staff, and house-surgeons Thiele and Auten, I proceeded to the operation. After the usual preparations for laparotomy, the patient was anæsthetized. The pubes were shaved, and the vagina washed out with two and one-half per cent. solution of carbolic acid. I then made an incision in the median line, from an inch above the symphysis pubis to two inches below the umbilicus. When the abdominal cavity had been opened, a dark red tumor, smooth and covered with peritoneum, was disclosed. It was round, about three inches high, and extended from a little above the symphysis to about two inches below the umbilicus, the left side being united with the sigmoid flexure. The needle of a small exploring syringe was now introduced into the tumor, but no pus could be withdrawn. On the withdrawal of the needle, however, a drop of pus came out at the opening. Antiseptic sponges were now packed around the tumor in the abdominal cavity, and an incision made through the wall of the sac. Several ounces of very fetid pus came out through the opening, whereupon the incision was enlarged, the edges seized with strong forceps, and sponges introduced to clean the cavity. A probe introduced into the cavity reached down to the posterior lacuna of the vagina. A counter-opening was made here on the end of a strong forceps, and a large drainage tube introduced through the vagina into the sac and brought out of the abdominal opening. There was slight hæmorrhage from the walls of the sac, which were covered with a soft layer of nodulated granulating tissue. This was partially scraped out and partially disinfected by a ten per cent. solution of chloride of zinc. The edges of the abdominal opening of the sac were now united to the lower end of the abdominal wound with a double row of sutures; the deeper one including only the two peritoneal layers, and the superficial one uniting the sac with the skin. The upper part of the abdominal wound was united in the usual way down to the sac. No drainage tube was inserted into the abdominal cavity, as no adhesion had been either detached or ligated. A large antiseptic dressing was applied over the abdomen, iodoform gauze having been packed around

the drainage tubes, both above the symphysis and in the vagina. The operation occupied an hour and a half.

The patient vomited twice during the afternoon. The pain in the abdomen was controlled by hypodermic injections of morphine. She complains of thirst, is warm and perspiring. A small quantity of dark greenish colored urine was withdrawn by catheter. Pulse, 140; temperature, 100.6°.

17th. 1 A.M. Pulse, 132; temperature, 101.5°. She has been delirious for two hours, and throws herself from side to side of the bed. 6 A.M. Pulse, 132, weak; temperature, 103.2°. 8 A.M. Pulse, 126; temperature, 104. She complains of pain, and there is tenderness in the right side of the abdomen, in the right, lower part of which some resistance can be felt, which was not noticeable yesterday. On removal of the dressings there is no discharge from the drainage tubes.

Thinking that the considerable rise in temperature was due to accumulation of fluid in the peritoneal cavity on the right side of the sac, I reopened the wound, under ether narcosis. Three to four ounces of bloody serum were found in the right iliac fossa, and antiseptic sponges introduced to clean the cavity, from which a number of shreds of fibrinous exudate were removed. A drainage tube six inches long was inserted and the wound reunited.

3 P.M. Pulse, 112; temperature, 101°. She has slept for two hours, but is now delirious and restless again. 7 P.M. Was quiet and talked rationally for a couple of hours in the afternoon, but soon lapsed again into delirium, and is now wild and excited, so that it is necessary to apply a strait-jacket.

18th. 7 A.M. Pulse, 118; temperature 100°. She slept quietly most of the night; talks rationally, is bright, complains of no pain, and says she feels hungry. 11 A.M. Pulse, 130; temperature, 101°. About an hour ago she became delirious and wild again, but was quieted by a hypodermic injection of morphine and atropine. The wound was dressed, and very little discharge from either drainage tube was found. All traces of iodoform were removed from the abdomen and vagina, the sac of the abscess washed out with saturated solution of boracic acid, and the wound dressed with borated cotton. 6.30 P.M. Pulse, 122, very feeble and irregular; temperature, 101°. There is subsultus tendinum. The lower jaw constantly moves and the lips tremble. At times she mutters a few unintelligible words. There has been no vomiting, and she takes considerable quantities of milk, champagne, and whiskey.

19th. 9 A.M. Pulse, 112; temperature, 99.8°. She slept a little during the night, and on awaking was quiet and perfectly rational.

Says she is hungry. Has taken hot milk, brandy and iced champagne, and retains all she takes. 12 noon. Pulse, 114; temperature, 100°. Wound was dressed. There was a slight discharge of fetid pus from the abscess cavity, and a few drops of purulent fluid from the abdominal cavity. The drainage tube into the latter was shortened two and a half inches. 7 P.M. Pulse, 126; temperature, 100°. Patient has been quiet all day, and rational. The quantity of urine, which has been drawn by catheter three times a day, is only three to four ounces, amber colored, and contains nearly fifty per cent. of albumen, and a number of granulated casts.

20th. 7 A.M. Pulse, 112; temperature, 100. She slept fairly well, and takes soup and milk in considerable quantities.

21st. 7 A.M. She was somewhat delirious during the night, but got quiet toward morning. 3 P.M. Pulse, 96; temperature in rectum, 99°. Very little discharge in the dressings. She is rational, and complains of no pain. The abdomen is soft and natural. No tenderness anywhere.

22d. 12.30 P.M. Pulse, 104; temperature in rectum, 99.5°. She was slightly delirious last night, but slept most of the time; takes considerable nourishment. The abdominal drainage tube was shortened two inches.

23d. A.M. Pulse, 110; temperature in rectum, 100°. 6 P.M. Pulse, 150, weak and small; temperature in rectum, 101.4°. She has been slightly delirious all the afternoon. Does not answer questions rationally. Her hands are cold, and she looks collapsed. 8 P.M. Pulse, 156; temperature in rectum, 101°. She is troubled with singultus; is rational now, and says she is very weak and feels sick.

24th. 2 A.M. Pulse, 130; temperature in axilla, 99.3°. Late last evening she became warmer, and slept several hours during the night. Had some diarrhoea, and most of the liquid fæces came out through the vagina and the drainage tube. 6 A.M. Pulse, 136, weak; temperature in rectum, 101°. She is restless. Very little discharge in the dressings. Takes nourishment as usual, but somewhat less in quantity. 5.30 P.M. Pulse, 130, weak; temperature in rectum, 101°. Patient is in semi-unconscious condition, restless, and continually troubled with singultus. No vomiting, no evidence of peritonitis. She takes nourishment, but swallows slowly. She is warm all over the body. There is some hyperæsthesia, as the hypodermic injections cause her to complain more than usual.

25th. 7 A.M. Pulse, 140, almost imperceptible at the wrist; temperature in rectum, 106°. She has been in the same semi-comatose condition all the night. Has singultus all the time. It is difficult for

her to swallow, and the extremities begin to be cold. At 11 A.M. the patient died.

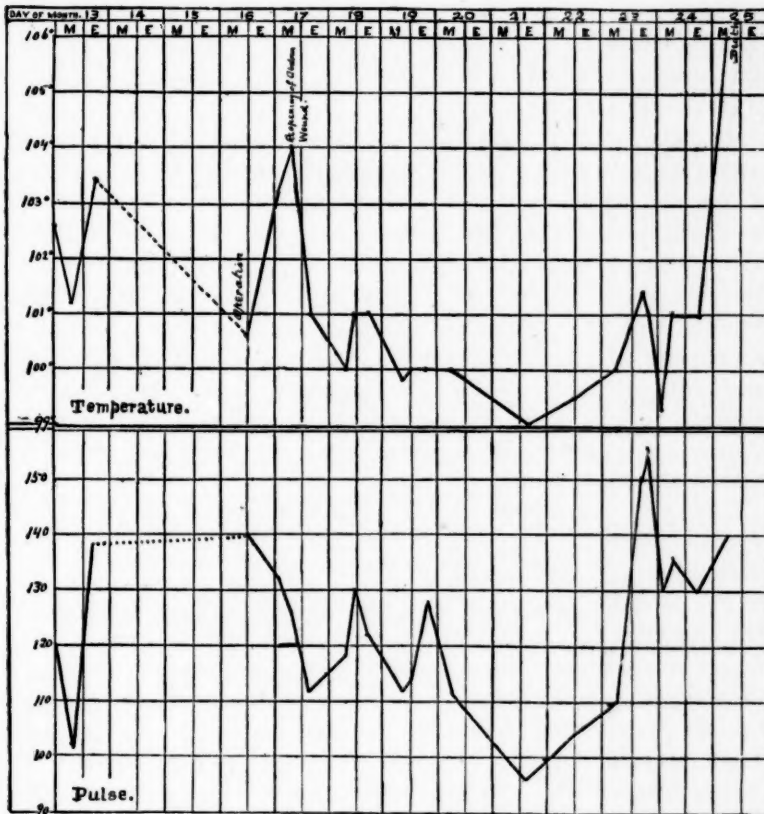


FIG. 1. CHART SHOWING TEMPERATURE AND PULSE VARIATIONS IN THE CASE OF MARGARET ROBINSON.

Autopsy—Twenty-four hours after death, in the presence of Drs. Auten, Thiele, and others of the internes. The body was not emaciated. No œdemas. Rigor mortis. No pus in the dressings. Heart and lungs normal. No fluid in the abdominal cavity. Peritoneum everywhere glistening and healthy. The peritoneal drainage tube is only one and a half inches long, and the narrow canal in which it lies contains a few drops of pus and is firmly adherent all around, and separated from the peritoneal cavity at large. Liver of normal shape and size, somewhat pale, but otherwise normal. Spleen enlarged to twice its normal size, and shows on its cut surface the features of a

typical sago-spleen—that is, amyloid degeneration of the Malpighian follicles. Reaction with iodine distinct. Kidneys of normal shape and size, capsule small, not more adherent than usual; the cortical substance somewhat pale in contrast with the dark red pyramids; the boundary between the cortical substance and pyramids distinct. Solution of iodine poured over the cut surface shows amyloid reaction of a number of the glomeruli.

MICROSCOPICAL EXAMINATION AND DESCRIPTION OF THE ORGANS OF THE PELVIS MINOR.—The microscopical examination of the kidneys shows the following: In the cortical substance in almost half of the glomeruli is found amyloid thickening of the afferent arteries and of the capillary arteries of the glomeruli. In some of them the wall of the glomerulus is thickened. There is also found a number of urinary tubules filled with solid refracting homogeneous amyloid casts, and in some places the transformation of the epithelial cells of the canals into amyloid matter can be distinctly recognized by the enlargement and homogeneous refracting appearance of the epithelial cells. In the pyramids no amyloid degeneration, either of the vessels or of the urinary tubules, is found.

The spleen presents the usual microscopical appearance of amyloid degeneration of the Malpighian corpuscles, and the walls of the arterioles leading into the latter.

The pelvic organs, removed as a whole, show the following: In the left broad ligament is an abscess, thick-walled, four inches long, three inches broad, covered with a smooth layer of peritoneum. The top of the abscess is at the height of the fundus of the uterus, and the peritoneum from the latter stretches out continuously over the abscess. From this point the abscess extends along the posterior surface of the uterus, downward and inward along the left side of the rectum. The wall of the abscess is a quarter of an inch thick, consisting of firm white fibrous tissue. Under the microscope this is found to consist of an inner layer of young connective tissue, densely infiltrated with small round cells, leucocytes, especially near the rugged inner surface of the abscess cavity. This layer is about one millimeter in thickness. Outside of this is a heavy layer of dense fibrous tissue, containing a small amount of medium-sized vessels. This layer is about four millimeters in thickness. Outside of this, nearest to the peritoneum, comes a layer about one millimeter in thickness, in which longitudinal and transverse bundles of organic muscular fibres are predominant over the connective tissue surrounding them. Outside of this is a smooth covering of peritoneum.

On the right side of the abscess wall, three inches from the top and one inch from the bottom, is an opening into the rectum, large enough to permit the passage of a goose quill (as shown in Fig. 2). The opening in the rectum is exactly four inches above the anus. The left round ligament passes along the anterior surface of the abscess, as

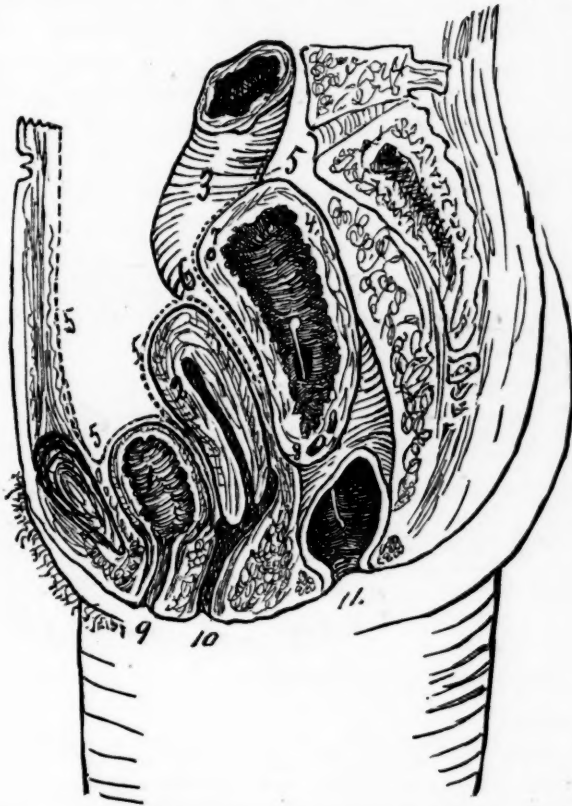


FIG. 2. SAGITTAL SECTION THROUGH PELVIC ORGANS.

1. Bladder; 2. Uterus; 3. Rectum; 4. Abscess, with opening into rectum, where probe is passed through; 5. Punctated line showing the peritoneum covering the pelvic organs; 6. Narrow space covered with peritoneum between posterior wall of uterus and anterior wall of abscess; 7. Transverse section of left Fallopian tube in abscess wall; 8. Large uterine vessels in inferior posterior part of abscess wall; 9. Urethra; 10. Vagina; 11. Anus.

shown in Fig. 3, which is situated between this and the Fallopian tube. The left Fallopian tube is twisted around and pressed against the posterior surface of the uterus, and runs down along the latter in the abscess wall. A fine probe introduced in the peripheral end of the Fallopian tube comes out into the abscess cavity. Along the right

border of the uterus is a firm longitudinal tumor (10, Fig. 3), two inches long, three quarters of an inch broad, firmly connected with the side of the body of the uterus, and covered with peritoneum continuous from the latter. A section through this tumor shows uniform reddish brown tissue, in which the canal of the right Fallopian tube is imbedded. This canal widens, downward toward the lower end of the mass, into an irregular, ragged cavity, three-quarters of an inch long, quarter of an inch broad, from the bottom of which the probe passes down into the rectum through the same opening as the abscess in the left broad ligament. Another opening passes directly from the small cavity into the large abscess cavity. In the bottom of the large abscess cavity is a large incision opening, for the drainage tube, into the cul-de-sac of the vagina.

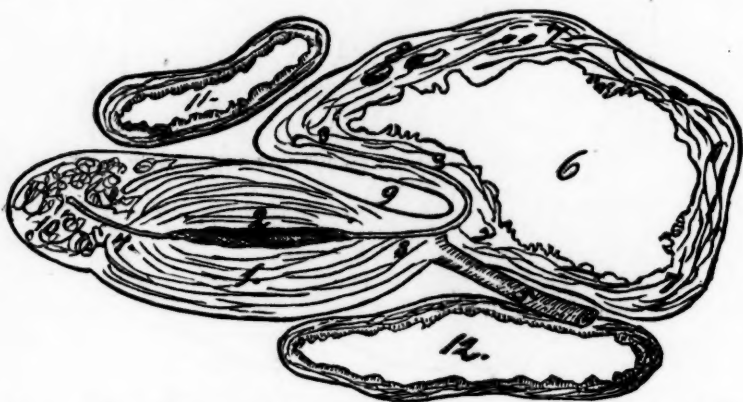


FIG. 3. HORIZONTAL SECTION THROUGH PELVIC ORGANS AT LEVEL OF CORPORIS OR FUNDUS UTERI.

1. Fundus uteri; 2. Cavum corporis; 3. Left Fallopian tube; 4. Right Fallopian tube; 5. Ligamentum teres; 6. Abscess cavity; 7. Abscess wall; 8. Uterine vessels in abscess wall; 9. Narrow space covered with peritoneum between posterior wall of fundus uteri and anterior wall of abscess; 10. Mass of brownish red connective tissue surrounding right Fallopian tube—remainder of hæmatocele; 11. Rectum; 12. Bladder.

Between the posterior surface of the corpus of the uterus and the anterior surface of the abscess wall, there is a space or cavity three-quarters of an inch broad, an inch and a quarter deep, and one or two lines in antero-posterior diameter. This space is covered all over with peritoneum, and forms a recess or cul-de-sac extending deep down between the uterus and the abscess (6, Fig. 2; 9, Fig. 3), closed at the bottom and communicating upward with the general peritoneal cavity. It will be seen from Fig. 2 that if the operator undertakes to dissect up from the posterior lacuna along the posterior surface of the

neck of the uterus, such recesses might easily be penetrated, and the peritoneal cavity, in this way, opened.

The true situation of the abscess is readily seen in Fig 3. It lies in the broad ligament, between the round ligament and the Fallopian tube, separating these to such an extent that the Fallopian tube is bent backward and to the right, so that it runs parallel with the posterior surface of the uterus. It will be seen, further, that the whole superficial third of the abscess is covered with peritoneum, which extends down from the abscess into the recesses between the latter and the uterus, and, further on, covers the uterus and bladder in the usual way, forming these recesses before extending over on the posterior surface of the anterior wall of the abdomen. It will be seen from this that there is no possibility of reaching the abscess from above without penetrating the peritoneal cavity.

It might be questionable whether it is justifiable to operate in a case where albuminuria and the ominous œdema of the of the legs have already developed. It is still a matter of doubt whether amyloid degeneration while yet in its initial stages, may not be made to disappear by removing the cause. The œdema round the ankles might, in cases of this kind, be due to pressure on the iliac vessels by the tumor. This would deprive it of a portion of its ominous significance.

Not to operate is to leave the patient to her fate, and I must confess that I am not sure that I should absolutely refuse to operate in an exactly similar case in future. That this patient died from uræmia, there can be scarcely any doubt, as she had no peritonitis, and as her temperature for the five or six days, immediately preceding death, and during the time of the wildest delirium, alternating with semi-comatose condition, was almost normal (vide temperature chart). This, taken together with the condition of the internal organs, as shown by the autopsy, precludes any suspicion of septicæmia. I have every reason to believe that if this patient had been operated upon in time, that is, about a year earlier, that a cure might have been effected.

That an early operation enables us to effect a comparatively speedy recovery, is well illustrated by the following case:

CASE III.—Chronic peri-uterine abscess in left broad ligament—Perforation into rectum and intermittent discharges, of three months

standing—No fever—Laparotomy with evacuation of twenty ounces of fetid pus—Sac united to abdominal wound—Out of bed in five weeks—A week later abscess cavity closed down to narrow fistulous opening with minimum amount of discharge—Two weeks later the fistula closed permanently.

Mrs. Inga Jenson, 29 years of age, came to me from Racine, Wis., November 26, 1884. Family history good. Parents both living and healthy. Her menses commenced in her fifteenth year, and have always been regular. She was married at 19, and a year later her first child was born, after protracted labor. For six months succeeding parturition she was confined to her bed, first suffering from fever, and local peritonitis, or severe pelvic cellulitis. During this time, also, an abscess was formed in the right breast, which was opened, and suppurated for some time. After this she felt as strong as before her illness. Two years and a half after the birth of the first child she was delivered of a second child at full term. The labor was easy. She nursed the child eleven months from the sound breast, and was well for two years subsequently. She then began to suffer from pain in the left inguinal region, of varying intensity. Early in June, 1884, she did a hard day's washing, and on the following day, house-cleaning, after which she was much prostrated, and said she felt too tired to eat or sleep. For the next nine weeks she was confined to bed on account of severe pain in left inguinal region, accompanied by some fever, which, however, subsided after a week or two. Last September she first noticed a discharge of pus from the rectum. At first the daily discharge was about half a teacupful, and occurred independently of the fecal evacuations. The discharge for some time occurred irregularly, once or twice in forty-eight hours, later on, two or three times a week, and finally, only once a week. In these two months she has had no fever, but has often suffered from attacks of pain, and felt weak and tired. She has had a fairly good appetite throughout, has slept well, and had no night sweats.

On examination, I find her pale, not emaciated; heart and lungs normal; no cedema of the lower extremities; urine normal; pulse, 78; temperature, 99.8°. In lower part of abdomen is a tumor commencing above the symphysis pubis, and extending up to an inch below the umbilicus; situated in the median line, four inches broad, and extending a little farther on the left than on the right side. Vaginal examination shows the uterus immovable, somewhat dislodged to the right, and toward the symphysis pubis. In the posterior lacuna, and in the left broad ligament, is felt a hard swelling, in which no distinct fluctuation can be detected. Bi-manual exploration shows the uterus to be united with the tumor into one immovable mass. Digital exploration through the rectum enables me to feel the tumor, but no place of perforation.

Diagnosis.—Peri-uterine abscess in left broad ligament, communicating with the rectum.

On December 3, assisted by Drs, Jacobson, Guerin, Randall, Murphy, Verity, Auten, and Thiele, I performed laparotomy. An incision was made from two inches below the umbilicus downward five inches in the median line, through the abdominal walls. The omentum that lay loose on the anterior surface of the tumor, was pushed aside, and the tumor exposed, which was covered all over with peritoneum of the color of the normal uterus. To the left it was adherent to the sigmoid flexure, and on its right side was a cyst, three inches long, and an inch and a half in diameter, with thin transparent walls. A hypodermic needle was introduced into the tumor, and a little pus withdrawn. The surrounding peritoneal cavity was packed with antiseptic sponges, an aspirator needle introduced, and about twenty ounces of very fetid, greenish, yellow pus withdrawn. A longitudinal opening an inch and a half long, was now made through the wall of the abscess, by means of the thermo-cautery. The edges of the sac were secured with forceps and sponges introduced. Slight hæmorrhage ensued from the nodulated granulating surface of the inside of the sac, but ceased after the application of ten per cent. solution of chloride of zinc. The cyst on the right side of the sac was emptied. It contained about two ounces of clear serous fluid. The opening into the sac was now united with the abdominal wound, by one deep and one superficial row of silk sutures, and two large drainage tubes, one perforated, the other not, inserted to a depth of about eight inches. The remainder of the abdominal wound was united with sutures. A heavy antiseptic dressing was applied, and the patient brought to bed. The operation lasted about two hours and a half.

4th. 6 P.M. Pulse, 102; temperature, 100.5°. She has had some pain, which was controlled by morphine. Has been rather restless, and has vomited twice; looks well, has taken some champagne.

5th. 8 A.M. Pulse, 96; temperature, 100°. Has slept for two hours at a time. There is considerable discharge of bloody fluid in the dressings. Cavity was washed out with a saturated solution of boracic acid. 9 P.M. Pulse, 100; temperature, 99.5°. She complains of pain in right iliac region, and has vomited once.

6th. 6 A.M. Pulse, 100; temperature, 99°. The pain continued the first part of the night, but the patient was relieved toward morning. 12 noon. Pulse, 108; temperature, 100.5°. There is very little bloody discharge in the dressings; some tympanites of the abdomen, but less pain and tenderness in right iliac region. 6 P.M. Pulse, 116; temperature, 102°. She has had an ounce of milk twice in the last hour.

7th. 9:30 A.M. Pulse, 108; temperature, 102°. Does not complain of any pain in the abdomen, but of pain in the back. Urine taken with a catheter is slightly alkaline, and contains triple phosphate crystals, urates, moving vibriones and pus. 3 P.M. Pulse, 114; temperature, 102.5°. 5 P.M. Pulse, 120; temperature, 103.2°. On account of this rise in temperature, I resolved to make ready to reopen the abdominal wound, but when I returned with the necessary instruments, two hours later, the pulse had fallen to 100, and the temperature, 101°, and she had no pain. I therefore resolved to wait.

8th. 8 A.M. Pulse, 104; temperature, 101°. She slept well the last part of the night, has no pain, and feels well this morning. The bladder is washed out three times a day with saturated solution of boracic acid. 6 P.M. Pulse, 104; temperature, 100.2°.

9th. A.M. Pulse, 96; temperature, 100.8°. P.M. Pulse, 96; temperature, 100°.

10th. A.M. Pulse, 98; temperature, 99°. P.M. Pulse, 100; temperature, 99°.

11th. A.M. Pulse, 104; temperature, 99.7°. She has slept well all night, and takes considerable nourishment. A small abscess in the lower end of the abdominal wound has opened through one of the sutures.

12th. A.M. Pulse, 98; temperature, 99.5°. P.M. Pulse, 100; temperature, 99.5°. From this time on pulse and temperature remained normal.

13th. All the sutures were removed.

15th. The discharge is becoming less. The tubes are beginning to be pressed out by the retraction of the abscess cavity, and are shortened two inches.

16th. Had a slight spontaneous discharge from the bowels.

19th. A considerable movement of the bowels this morning caused her some pain. The depth of the cavity is now only four inches.

26th. The patient sits up in bed. When the dressing was removed, it was found that the drainage tubes had been pressed out, and they were replaced with difficulty.

January 8th, 1885. The patient is able to get out of bed. There is very little discharge. The tubes were pressed out and replaced by a small tube, which is passed in about three inches.

14th. The patient leaves the hospital and returns home. On examination there is now found a small fistulous opening in the lower end of the abdominal wound, through which a probe can be passed in about three inches downward, backward, and to the left of the uterus. The amount of the discharge from the sinus is about one drachm in two

days. Vaginal exploration shows the uterus standing a little to the left and movable. No exudate or hardness can be felt on any of the sides. High up in the posterior lacuna above the neck, I can just reach with the tip of my finger, a movable resistant body, which feels like a string or band extending from the posterior side of the uterus, downward and backward, toward the rectum.

She has had no diarrhoea since the operation, has a good appetite, and can walk around the room all day without any pain in the pelvis whatever.

February 1st. The fistulous opening is closed.

The course of the after-treatment in this case was not so smooth as in the first case, on account of a small abscess in the lower end of the abdominal wound, and an attack of cystitis. To which of the two the rise in temperature on the fourth day after the operation was due, I am not able to state; but this rise in temperature, taken together with the pain in the right side of the abdomen, made me, at the time, regret that I had not inserted a drainage-tube in the abdominal cavity, to the right of the abscess, in the region of the cyst. I came very near re-opening the abdominal wound, fearing an accumulation of septic fluid in the right iliac fossa. The speedy retraction of the large abscess cavity and cessation of the discharge only proved that Lawson Tait¹ is right in asserting that recovery subsequent to free opening of an abscess of this kind, by laparotomy, is much quicker and more effective than when the abscess has been opened through the vagina.

In the following remarks, I desire to call attention, first, to the operation of laparotomy from a technical point of view; second, to its position as compared with other operations; and finally, to a few points in diagnosis.

I. THE OPERATION OF LAPAROTOMY. The abdominal incision, three to five inches long, in the median line, will always reach the upper convexity of the abscess, and has nothing worthy of mention, except that the abscess may be reached without penetrating the peritoneal cavity, in case the peritoneum has been pushed upward by an ante-uterine abscess. In cases of this kind, it is necessary to take care to avoid cutting into the bladder, which may have been drawn upward by the abscess wall. It is consequently necessary, when the abdom-

¹Op. cit.

inal incision is made, to have an assistant mark out the site of the bladder by a sound introduced into it. If the abscess is thus extra-peritoneal, the operation is greatly simplified, and is to be considered the same as the opening of any other abscess.

In the majority of cases, however, when the abscess is lateral or posterior to the uterus, it can be reached only by opening the peritoneal cavity—that is, by laparotomy—for which preparation has always to be made, since it is impossible to make a clear diagnosis beforehand, as far as this point is concerned.

When the abdominal cavity has been opened, we usually come right down on the sac of the abscess. If covered by omentum or intestines, these have to be pushed aside, and all possible adhesions ligated or detached. The upper surface of the sac, together with the uterus and appendices, will generally form a convex, red, smooth, more or less regular tumor, to the sides of which, outward toward the brim of the pelvis minor, loops of intestine or omentum generally adhere; but as we do not wish to extirpate the sac, we need not disturb these parts, if only a surface of two inches in diameter is clear—that is, space to admit of a sufficient opening being made into the sac, and of a sufficient margin round the opening for a double row of sutures to unite the edges with the anterior wall of the abdomen.

When the upper surface of the sac is thus clear, or has been cleared, the next step is to find some way into the sac, with due regard to the prevention of the escape of pus into the abdominal cavity. To this end, I always pack two or three large disinfected sponges around the sides of the cleared space, at the same time preventing any loops of intestine from slipping out through the abdominal incision.

We cannot expect to always find a soft or fluctuating point on the surface of the tumor, especially when the abscess communicates with the rectum or bladder, or, more rarely, with some remoter part of the intestinal canal. The sac cannot usually be distinguished, by touch or view, from the fundus of the uterus. The round tumor is uniformly elastic to the touch, feeling like a soft fibroid, or a soft, enlarged uterus. An explo-

ratory puncture has consequently to be made with the needle of a hypodermic syringe, at the point and in the direction where, from the previous examination, we expect the abscess to be, or where the tumor feels less resistant, than in other places. It is often necessary to introduce the needle several times, and in different places, before any pus can be withdrawn. In cases where the abscess has been evacuated into the rectum, or elsewhere, and the cavity is consequently empty, the needle must be moved in various directions, until a place is found in which it can be moved freely, indicating the presence of a cavity.

If pus is withdrawn, thus proving that the abscess cavity has been reached, it is advisable to effect as perfect an evacuation of the contained pus as possible. I consequently have the aspirator ready, and introduce the aspirator needle along the needle of the hypodermic syringe, which is left in the cavity, as a guide. If this precaution is not taken, it may sometimes be most difficult to find the abscess cavity a second time. The pus, which is usually fetid, is now aspirated, and the aspirator needle left in the cavity, as a guide for the knife in the incision into the sac. I advise that this incision be made by the thermocautery; the small, knife-shaped burner of Paquelin answers the purpose very well. I use this to avoid unnecessary hemorrhage, because it saves time, and prevents the blood, mixed with pus, from overflowing the peritoneal surface of the sac, in the wall of which the large uterine vessels may run, and we can never know where. It is well to have a small sponge ready to thrust into the sac as soon as the incision is made, because some pus is likely to flow out as soon as the sac is opened.

I then seize the edges of the incision with large, strong artery forceps; the large forceps of Billroth answers the purpose very well. By means of the forceps the opening into the sac is drawn forward, and the hæmorrhage from the surface, often nodulated and bleeding easily, checked by the introduction successively of a number of small sponges held by artery forceps. To aid in checking the hæmorrhage, and at the same time, disinfect the inner surface of the sac, these sponges may be saturated with a ten to twenty per cent. solution of chloride

of zinc, or if necessary, the inside of the cavity may be scraped out with the sharp spoon or curette. (Byford.¹)

If a counter-opening from the sac to the vagina is desired, a strong curved forceps is pushed down to the bottom of the sac till it can be felt through one of the cul-de-sacs of the vagina, through which an incision is then made by one of the assistants on the end of the forceps. The forceps is then pushed through this opening, and opened so as to dilate the latter. A heavy drainage tube is now firmly grasped by the jaws of the forceps and drawn up from the vagina through the sac and out of the abdominal incision.

The next step is then, after carefully cleaning the peritoneal surface of the sac, to unite the latter to the part of the abdominal wound nearest to it, by a double row of sutures. I use silk for all the sutures. The deeper row about a quarter of an inch from the edge of the opening into the sac, and not penetrating the whole thickness of the wall of the latter, unites the peritoneum of the sac with the peritoneum of the anterior wall of the abdomen. These sutures must be sufficiently near to each other (less than quarter of an inch apart), to hermetically close up the peritoneal cavity. The outer row of sutures passes through the entire thickness of the abscess wall, along the incision into the sac, and through the whole thickness of the abdominal wound, thus uniting the edge of the skin with the edge of the inner wall of the abscess cavity. The rest of the abdominal wound is then united in the usual way, after the removal of the large sponges and the necessary toilet of the abdominal cavity.

The question arises here, whether or not it is advisable to insert a drainage tube in the abdominal cavity. This depends, of course, entirely upon the amount of detached adhesions as in all other laparotomies. But in laparotomy for abscesses it is more desirable not to have a drainage tube in the abdominal cavity, because of the danger of a secondary infection from the fetid abscess cavity through the abdominal drainage tube, as it is practically almost impossible to effect a perfect seclusion between the abdominal tube and the tube leading into the ab-

¹ American Gynecological Association, Philadelphia, Sept., 1883; Medical Record, Sept. 22, 29, 1883.

scess. Such a necessity may, however, arise, and then the best course possible under the circumstances is to be pursued.

Heavy antiseptic dressing should be applied over the abdomen, and, also, an intra and extra-vaginal dressing sufficient to cover the drainage tube in the vagina. I consider iodoform in such cases especially valuable, when communication with the rectum makes it possible that fæces will come in contact with the abdominal wound. The dressing should be changed at least once a day, and the sac washed out with an antiseptic solution, for which I prefer saturated solution of boracic acid, as there is then no fear of poisoning. In other respects there is nothing in the after treatment worthy of especial mention. The drainage tubes should be shortened or removed, as the retraction of the sac and the diminution in the amount of pus discharged, demand. The sutures in the abdominal wound should be removed as usual; also the superficial row, uniting the sac with the skin; the deep row of sutures around the sac being left in permanently.

It is natural to expect that some infection may take place along the stitches at the lower end of the abdominal wound, between the sac and the symphysis, and that consequently an abscess may form here in the wall. This complication is, however, not likely to prove very serious, as the pus has already a ready-made exit along the stitches.

In close connection with the operation of laparotomy for peri-uterine abscess, the question naturally arises: would it not be safer in such cases, as it unquestionably is, in the opening of abscesses of the liver, to operate *in templa*, that is, to effect union of the surface of the sac with the anterior abdominal wall before the abscess is opened (Volkman). The safety of performing the whole operation at one sitting will depend, to a certain extent, upon the skill of the operator; but Lawson Tait's record of thirty operations, each at one sitting, without a single accident, may be considered almost a definite answer to the question. There is, moreover, a very tangible difference between an abscess in this locality and an abscess in the liver in the following respects:

The liver participates in the respiratory movements; the peri-uterine abscess does not. The wall of an abscess of the

liver is friable, and furnishes a very insecure substratum for the application of sutures, while the walls of a peri-uterine abscess are thick and solid.

Regarding effective drainage of a peri-uterine abscess the question comes in of the advisability of a counter-opening through the vagina. Lawson Tait's experience, as well as my own, seems to indicate that the counter-opening through the vagina is not necessary, and I think I shall not resort to it in future operations, at least not at the time of operation. If, in the course of the after treatment, rise in temperature and the accumulation of pus in the lower part of the sac, should demand it, a counter-opening in the vagina can be made.

II. LAPAROTOMY AS COMPARED WITH OTHER OPERATIONS. When a peri-uterine abscess points somewhere in the vagina around the lower part of the uterus, no surgeon would, of course, think of doing anything, but opening the abscess, inserting a drainage tube, and by washing out, endeavoring to effect the closure of the cavity. But in some cases the opening into the vagina is just as ineffective as a spontaneous opening into the rectum. In obstinate cases of this kind laparotomy, at a later period, will have to be performed.

There is, however, no doubt that secondary invasion of septic poison, when the abscess is opened from the vagina, is much more difficult to prevent than invasion into the abscess from the abdominal opening. It is only in this way that we can account for the difference in the course of the after-treatment of peri-uterine abscesses opened through the vagina and through the abdominal cavity. A difference that Lawson Tait rightly calls attention to as being decidedly in favor of the abdominal operation. Here the abscess closes more quickly, and the course of the after-treatment is much less febrile than in the vaginal operation.

Sometimes a peri-uterine abscess will point into the rectum, sufficiently low down to permit of an opening here. It does not seem probable that the access from the rectum will be very promising, as effective drainage is next to impossible; but the cases of cure by spontaneous opening into the rectum evidently make an operation here permissible, and perhaps advisable, but only as a trial. If the abscess does not retract within a reasonable time, other measures must be resorted to.

It is needless to state that if a parametritic abscess points anywhere along the iliac fossa, it should be opened and drained from this point; but this does not belong to my subject of to-day, as I desire to call attention only to strictly circum-uterine abscesses, which can only be reached from the vagina or from the supra-pubic region.

When a circum-uterine abscess does not point downward, and, in fact, does not point anywhere, it is then the surgeon's task to find the safest way into the abscess through a smaller or larger amount of surrounding tissues.

We shall first consider the vaginal operation:

When so eminent an authority as Schröder, of Berlin, advocates this method of reaching a high peri-uterine abscess there must be cases in which this operation is advisable. From a general point of view an extra-peritoneal outlet of the abscess through the vagina would seem to be safer than laparotomy, upon the same grounds as a vaginal hysterectomy is safer than Freund's abdominal hysterectomy, and Schröder's successful operation, already mentioned, vouches for the method.

At the same time, I firmly agree with Lawson Tait, that there are some grave objections to the vaginal operation. In the first place, a high seated peri-uterine abscess is difficult to reach. It is difficult to work with safety two or three inches above the introitus of the vagina, in tissues that are immovable, and where the parts cannot be drawn down toward the operator. These difficulties are, of course, of less importance in the master hands of an operator like Schröder, but increase in significance for less experienced surgeons.

But the operation through the vagina is more or less an operation in the dark. As shown in fig. 1, we may be dissecting up along the posterior surface of the neck of the uterus, and may open into recesses of the peritoneal cavity between the abscess and the uterus. Further, it might be easy in this place to open into the rectum.

Another danger, especially in abscesses between the two layers of the lateral ligament, might easily arise from the rupture of the large uterine vessels running in the wall of the sac, as shown in the figures. It would be exceedingly difficult, and I should say next to impossible, under such circumstances, to

secure and ligate these vessels, the point of ligation being so high up, the working space so small, and the tissues so immovable.

All those objections and dangers we do not encounter in laparotomy. We can see distinctly, and recognize with our own eyes, every particle of tissue we have to divide, the large uterine vessels, if divided, can easily be taken up and ligated. There is no risk of having any communication between the abscess and the peritoneal cavity, which we cannot either close up or drain.

If the laparotomy lasts longer, and gives more technical work to the surgeon, it seems to me that these objections are fully balanced, by the advantage of not being obliged to operate in the dark, of not having to battle with enemies that we cannot see, and consequently cannot guard against.

But these are not the only advantages of laparotomy, as compared with the vaginal operation. The free access to the whole interior of the abscess cavity has also to be taken into account. By laparotomy, the abscess is laid open to about the same extent as a tubercular peri-articular abscess. We can examine the whole interior of such a cavity, and scrape off, or remove by other means, whatever objectionable material we may find, cheesy matter, tuberculous tissue, fungoid granulations—since we can see clearly every place where the instrument is applied, without any danger of going through the abscess wall into any surrounding cavity or organ.

It is more than possible that this free access to the abscess wall has something to do with the speedy recovery subsequent to laparotomy, as compared with the vaginal operation.¹

But, of course, there will always be connected with laparotomy the inherited dread of opening that ominous peritoneal cavity. Modern surgery, however, is making steady progress in diminishing these dangers. Thus, the dread, as well as the safety of the patient, will, to a great extent, rest in, or depend upon, the care and skill of the operator.

III. POINTS IN DIAGNOSIS. It is, of course, always important to know, in a given case, if a circum-uterine exudate contains pus, or if it is, as it may be in many cases for a long time,

¹Lawson Tait, *op. cit.*

or may always remain throughout, a solid mass. Even a large abscess will often seem to the touch just as firm or tense as a fibroid, or any other solid tumor.

As for the other differential diagnostic symptoms, tenderness and local heat are, of course, perfectly valueless. Bandl is hardly correct when he states¹ that the diagnosis of suppuration and formation of abscess in the pelvis is generally not difficult, because, as he says, we may expect pus when the evening fever increases, and rigors and night-sweats appear. There are certainly cases in which even a large abscess containing more than a pint of pus may be present without fever, rigors, or night-sweats. I have twice seen such a case.

The question now arises how to make sure of the presence of pus in peri-uterine exudate, that lasts so long, brings the patient down, and resists treatment so persistently that we have reason to suspect its presence. The first step, of course, to this end, is exploratory puncture through the vagina. When this is made by a fine aspirator needle, I believe it to be comparatively safe. Of course, the finer the needle, the safer will the operation be; but, at the same time, it may be that the pus is so thick or slimy that it will not pass out into the syringe. A larger needle or trocar, which, of course, may have to be introduced in different directions and different places, is not entirely harmless. Emmet says: "I cannot regard the introduction of the trocar, into the inflamed tissues of the pelvis, as a procedure free from danger, under all circumstances."

If, then, as is almost always the case, the abscess can be felt as a distinct tumor between the symphysis and umbilicus, the question of an exploratory puncture at this place might arise. I should never dare to do this, because the needle would pass through the abdominal cavity, in the majority of cases, and, when withdrawn from the abscess, would be followed by a drop of pus, sufficient to set up immediately a general acute peritonitis.

In consequence of this, and especially when the tumor presents above the symphysis pubis, I should feel inclined, even after unsuccessful vaginal exploration with capillary needles, to advise exploratory laparotomy. I would prefer to do this even

¹Die Krankheiten der Tuben und die Extra-Uterin Schwangerschaft.

if I had to encounter a solid tumor and close the abdomen again, rather than to expose the patient's life by too much exploratory puncture. I believe that exploratory laparotomy in such cases is less dangerous. I do not wish, however, to be understood as being an advocate of indiscriminate laparotomy for peri-uterine exudates, or for the mere satisfaction of a diagnosis; but I want this measure limited, of course, to obstinate chronic cases, where the very pertinacity of the exudate, even if no fever is present, indicates pus somewhere in the center of it, and makes the patient a confirmed invalid.

In cases like my three here published, where the abscess communicates with the rectum, there is, of course, no difficulty in diagnosis, and no need of preliminary explorations. But every experienced gynecologist knows, post-mortem reports in the literature show, and abscesses mistaken for fibroids prove, that a number of peri-uterine abscesses, having no communication with any cavity outside of the abscess wall, exist for a long time, with or without fever. It is for such cases, in my opinion, that exploratory laparotomy is indicated.

I had the opportunity, a few years ago, to make a post-mortem examination in a case of a large circum-uterine abscess (a patient of Dr. S. H. Stevenson, of this city), in which the patient had been an invalid for two years, and had traveled for her health two years in Europe and America. She finally died rather suddenly and unexpectedly, without having been confined to bed more than a day or two. A few hours previous to her collapse, a copious, purulent, bloody discharge from the rectum indicated a rupture into this organ. The post-mortem examination, although all important organs were examined, failed to reveal to me satisfactorily what the immediate cause of death was.

I further believe that it is dangerous to wait too long, in cases where we have every reason to suspect an abscess, before we operate, because the amyloid nephritis may, as shown in my second case, make us seriously regret the too late surgical interference.

In conclusion, I wish to pay a final compliment to Lawson Tait, the first advocate of free laparotomy in cases of this kind. It was the report of his first cases that gave me the courage to

operate in my first case. The more attention I have had the opportunity to pay to this subject, the more I believe he is right; and I believe also that he has accomplished a most important step forward in the successful surgical treatment of the ominous cases of chronic peri-uterine abscess.

ON A PECULIAR FORM OF FIBROUS TUMOUR
WHICH TENDS TO MULTIPLICITY
AND INDEFINITE GROWTH.

By JONATHAN HUTCHINSON, F.R.S.,

OF LONDON,

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THERE is a kind of fibro-cellular tumour which runs rather a peculiar course and is occasionally multiple. In most of its features it appears to be quite innocent; that is, it does not infiltrate adjacent structures, and is usually encapsuled. Its multiplicity would, however, suggest that it is possibly infective; and it does occasionally ulcerate and fungate.

The two best examples of this form of new growth that are in my mind occurred in ladies in early middle life.

Mrs. P—, of Darlington, died after amputation at the hip for an enormous tumour of this kind. It had been growing for more than ten years. It had developed deeply in the right thigh, but did not adhere either to bone or to skin. It had at first lifted the femoral vessels forwards, but, I believe, eventually it wrapped round them.

I had seen Mrs. P. repeatedly, at long intervals, during six years previous to her death, and had once had a consultation with Sir James Paget on her case. When I first saw her, the tumour was so large and so deeply placed that it would have been impossible to attempt its extirpation without being prepared to amputate at the hip joint. She was in feeble health, but still quite able to discharge all her domestic duties; she

had a large, young family, and the prolongation of her life was of the utmost importance. After much consideration, I advised her not to have an operation, believing that the immediate risk of one would be more than it was worth her while to encounter, and being influenced also by the fact that she had other tumours. One such had been excised from her back, recently, in Leeds, and was reported to be of fibrous nature, and near its scar there was another about as large as a plum. It seemed to me not unlikely that, even if Mrs. P. survived the excision, or possibly an amputation at the hip joint, these tumours might take to growing, or that others might develop. I am inclined to think that my advice was justified in the sequel. Although greatly incommoded by the enormous size and weight of the tumour in the thigh, Mrs. P. lived for five years after I first saw her, and during the greater part of that time was able to discharge all her social duties. At length becoming quite incapacitated by the mere bulk of the growth, and confined to her bed, amputation seemed the only resource. It was performed with every possible precaution and skill by Mr. T——, of Leeds, but she sank within a few hours after it.

I doubt much whether the operation could have been done earlier with any better result. It is, of course, possible that the tumour might have been enucleated; but so deeply did it extend, that I do not think that such an operation would have been less dangerous than amputation.

The tumour was a firm, lobulated mass: as stated, it never adhered to the skin, and I believe it never caused any material pain.

The tumour which I have mentioned as present in Mrs. P.'s back had not, I believe, grown materially, and she had none other. It is very possible that, had the primary one been removed, its activity of growth might have been transferred to this smaller and more quiet one. There was never any gland affected with the disease. It is to be noted that whilst this primary thigh tumour began deeply under the femoral vessels, the two others were subcutaneous. In my next, the same peculiarity was present, but the order was inverted. The original tumor was subcutaneous, and the secondary one deeply placed under the sterno-mastoid.

The subject of my next case is a lady named R—, who was introduced to me by Mr. Nixon, of the London Hospital, with whose family she is connected.

In 1881, I excised from Mrs. R.'s thigh (the outer side of the left) a lobulated tumour which had been growing for three or four years in the subcutaneous cellular tissue. It had finally adhered to the skin, ulcerated, and showed tendency to fungate and bleed. I had some difficulty in bringing the skin together after its removal, but notwithstanding the tightness, primary union resulted. At the time that I did this operation, Mrs. R. had a lump deeply placed in the right subclavian triangle. It had been there for many years, and showing but little tendency to grow, I was quite willing to let it alone. Three years after the removal of the thigh tumour, Mrs. R. came back to me with the statement that the lump in her neck was increasing, and that she was afraid that one was forming in her left breast. This was on May 2, 1884. The tumour in the neck presented some features of considerable interest. It was, perhaps, as big as two adult fists placed together, and filled the whole of the space above the clavicle. It had pushed the trachea over to the right, and lifted the sterno-cleido muscle and the carotid artery on its surface. It was rounded in outline, quite painless, and did not appear to adhere to any structures, unless, indeed, it had an attachment deeply behind the sterno-clavicular articulation. The tumour in the breast, about which Mrs. R. was anxious, was not bigger than two peas, but was very tender. I advised her to wait a month, and let me see her again. It seemed not improbable that the tumour in the neck might be encapsuled, and would shell out by a free incision under its posterior surface. There were some important facts in her family history. Her mother had died at the age of 32, and was the subject, amongst other ailments, of cancer of the uterus. A maternal aunt who was still living had had a breast removed 23 years ago on account of a tumour which had recurred twice after removal.

Both Mrs. P. and Mrs. R. were of light build and rather thin. Both had married young and had large families. It will be seen that in both cases there had been no recurrence near the place from which the tumour had been removed,—the second

tumor which was present on Mrs. P.'s back having been there at the time of the operation.

I have seen Mrs. R., the subject of my second case, again quite recently. The tumour in the neck is growing rather fast. There can be no doubt that its rate of increase has been much quickened since the removal of the one from the thigh. At the time of the operation, it was this latter which alone manifested tendency to growth. I have advised Mrs. R., in spite of its dangerous position, to have the tumour removed from her neck, as it is likely to cause her great inconvenience and danger before very long. My hope is that it will prove to be encapsuled.

I have ventured to bring these cases before the readers of the *ANNALS* because I think they are examples of an unusual form of tumour, and one which obviously presents an important surgical problem. It seems to me very important, in our present state of knowledge of new growths, that we should endeavour to construct clinical groups, selecting for that purpose cases which are really in their whole clinical history closely parallel to one another. Histology is very helpful, but it can not give us all that the surgeon requires for his guidance.

THE CURE OF SOME UTERINE DISPLACEMENTS BY SHORTENING THE ROUND LIGAMENTS.

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WHEN a new drug is proposed to the medical profession as a remedy for a disease, hitherto unsatisfactorily treated, a trial is rapidly and thoroughly made, and the merits of the drug quickly ascertained. A new instrument that promises to supply a want, is also, at first, extensively used, and soon takes its place amongst the failures, or successes of inventors.

A new operation, requiring special knowledge or skill for its performance, takes a much longer time before it can win its way, even to the favor of being tested. The leaders of the profession, necessarily oldish men, with "undilatable pupils," are consequently slow in learning anything new, and the rank and file turn deaf ears to any one, not a leader, who may consider he has found something worthy of trial. Hence an obscure practitioner, who believes he has made a discovery, must keep writing and speaking about it until he gets a hearing, else the discovery will sink into oblivion, to be revived again by some one with the apostolic powers that the originator lacked.

This is my excuse for again obtruding my operation of shortening the round ligaments on the medical public.

It consists in cutting down upon the external abdominal ring, the incision beginning at the pubic spine, and passing upwards and outwards in the direction of the inguinal canal, for one or two inches, according to the stoutness of the patient, and the experience of the operator. By subsequent incisions, the glistening tendon of the external oblique, and the external abdominal ring are to be fully and clearly brought into view. On turning out the contents of the ring, the round ligament is exposed, and should be gently drawn out by the fingers of the operator. Where the operator's fingers are inexperienced, a broad-pointed pair of forceps may be more successfully used for this purpose. As the ligament is drawn out, adhesions to the surrounding tissues should be snipped through with scissors. After a little coaxing the ligament runs with facility. When it is found to control the uterus (already placed in the desired position), the ligament is to be stitched by three catgut sutures to both pillars of the external ring. The opposite side is now treated in the same way. The slack of each ligament is to be packed beneath the skin or cut off according, as it is healthy, or much frayed and squeezed through extrication of the beginning of the ligament. The deep sutures should be loosely but securely tied, so as neither to constrict the ligament nor readily to let it slip back into the abdominal parietes. The wound should, in all cases, be drained to avoid tension. Any suitable dressing may be applied. A pessary is lastly to be

inserted to support the womb, during the healing process, and may be retained for about a month for this purpose; but after this the patient is much better without any support. Rest in bed for about three weeks is, I think, absolutely necessary to allow of good union at the external ring. In some cases *more* time may be required, but it would probably not be safe in any case to allow *less*.

Such is the operation that I have been practising since December, 1881. At that period it seemed to me very strange that so simple an operation had not been thought of before. It was not until June, 1882, that I learned from the *Glasgow Medical Journal*, that Dr. Adams, of Glasgow, had thought of it for some time, and even attempted to perform it for prolapse on the living, in February, 1882. In the *Centralblatt für Gynäkologie*, No. 7, page 109, sent to me by Messrs. Churchill, a few days ago, the following remarks are found:

"Der erste Gedanke in dieser Art gegen Lageveränderungen vorzugehen, ist französischen Ursprungs. Tillaux sagt in der 5. Aufl. 1884 seiner ausgezeichneten topographischen Anatomie, die wohl eine Übersetzung ins Deutsche verdiente: M. Alquié, pensant que ces ligaments étaient la cause de la résistance que l'on éprouve parfois à abaisser la matrice, avait eu la singulière idée de les raccourcir pour s'opposer aux chutes de cet organe. D'autre part, Aran, attribuant à ces memes ligaments le rôle, non de suspendre l'utérus, mais d'en attirer le fond en avant, avait songé à appliquer l'opération de M. Alquié à la cure de la rétroflexion. Dann hat Freund (Strasburg) die Operation studirt und schon vor langen Jahren an der Leiche ausgeführt."

I have not been able to obtain the evidence upon which these statements are founded, and would be glad if any reader would enable me to do so. In the meantime, I claim thorough originality in devising the operation, independent of suggestions of any one, and priority, by a long way, in carrying it out. In doing so, I do not wish to minimise the value of the ideas of any of the gentlemen just mentioned, but justice to myself requires me to say that I never heard of them until the success of my operation caused journalists, or the authors of the ideas, to refer to them. I hail with pleasure the eagerness with which Scotchmen, Frenchmen, and Germans, are claiming a share in the independent conception of the idea, and look upon it as a proof of the importance of the operation, the practical aspects of which are to form the subject of this paper.

I think I am now in a position to speak positively about the permanent results of shortening the round ligaments, the time element so much in request hitherto by critics, being now in such quantity (3½ years) as to satisfy the most cautious.

Thirty-seven cases have been operated on by me, and furnish my test of permanency, viz: Twenty-eight in hospital practice, and nine in private practice. The nine private cases have been, and are still, all under my eye. In all of them prolapse existed, mostly complicated with backward displacement, and in four cases with inveterate, exaggerated retroflexion, such as no pessary could control, except the last new one, and it was too late of invention. One of my retroflexion cases curled back the second day after operation, and in attempting to introduce a stem, the exceedingly nervous patient so shifted and struggled that the ligaments partly yielded, and the womb came down. The flexion, consequently, was never remedied completely. It is now much less than formerly, the womb, although flexed, is tilted forward, does not press as it did upon the rectum, and she has lost the dragging pain that she formerly had. The wood-cuts further on will show how this complication can be quite satisfactorily dealt with. In all the other private cases, two operated on four months ago, one six months ago, and six over one and a half years ago, their uteri maintain the positions in which I placed them at the time of operation. Four of these have been completely cured of all their symptoms; one has a floating kidney, which sometimes troubles her, but she has lost all her pelvic pains; one still suffers, but in an ever lessening degree, from chronic cystitis, that originated two years before operation, and from the retroflexion; in one I removed the uterine appendages, and verified perfectly by manual examination the normal position of the uterus, and the restraining position of the shortened ligaments, and three still suffer from repeated attacks of ovaritis, but have lost their dragging pains. It was doubtful whether these four last cases were suitable for the round ligament operation, or whether it would not have been better to have removed the appendages. In three their lives are so much more tolerable that the latter operation will probably not be needed.

I cannot, of course, lay hold on all the twenty-seven hos-

pital patients. A few disappeared immediately after their discharge from hospital, and have never been seen again. Fully two-thirds have been seen by me again and again, and tested by straining, &c., to see if any tendency to recurrence existed, without a single failure. Two cases, indeed, came back to me with the news that the womb had come down again. Both had been very bad cases of prolapse complicated with cystocele and rectocele, and just such cases as some of my reviewers ask incredulously whether the operation would be useful for them, and reply that they are afraid that it would not. In both cases I kept the women in hospital for several days, made them strain over hot water, walk rapidly up and down stairs, scrub floors, &c., and the nurse who examined them immediately after these exercises failed to find any uterine prolapse. The rectocele and cystocele bulged into the vulva on such occasions, and caused them to think that the prolapse was coming on. When assured that prolapse was, in my opinion, not to be feared, these women went out quite contented—fear rather than inconvenience having brought them into hospital.

One case of prolapse came under my care at the beginning of the present year, with a distinct prolapse after operation, the uterus really lying down between her thighs when I examined her. Her round ligaments had been shortened by another surgeon some time previously. Here, I said to myself, is a failure at last! On examining the cicatrices, I could see on the left side a dimpling of the scar, showing that that ligament still held to the pillars of the ring. I cut down upon the dimple, and, with a little searching, easily found the ligament and pulled it out easily for nearly three inches, thus displaying a splendid cord capable of thoroughly controlling the position of any uterus. The opposite ring and canal was filled with cicatricial tissue in which no trace of a ligament could be found. The left ligament was therefore fastened in position, and healed securely in the ordinary time. The patient is now going about, and I am convinced no failure will occur in her case; although, as I will immediately show, one ligament is not as good as two. Before coming to me, the patient had been going the rounds of the hospitals advertising a failure of the cure of prolapse. I leave my readers to judge of the jus-

tice of calling it a failure of my operation. I am now firmly convinced that failure will never occur after a thoroughly successful operation.

There are two main obstacles to its successful performance. First, the operation is a delicate anatomical one,—the finding, release, and drawing out of the ligaments with facility depending largely on a thorough practical knowledge of the part operated on. The landmarks that guide us in the external incision are plain enough, but beyond that no set of rules are of much value, being superfluous to the anatomist and useless to those ignorant of the anatomy of the inguinal region. I have already heard of close upon a dozen cases where would-be operators have had to desist in disgust, unable to find the ligaments; and I have been asked, again and again, Are the ligaments always present? They are always present, as more than a hundred autopsies have shown me, made at all ages (besides my thirty-seven operations). The chief point to insure success in finding the ligaments is to expose well, in the first instance, the glistening tendinous pillars of the ring and its contents. Then deliberately turn out on a director or aneurism needle the contents of the ring, when the ligament will be recognized lying to the lower side or sometimes in front of a mass of fatty and fascial tissue. It may be known by its grey color and by the genito-crural nerve that lies close upon it. This nerve, as well as fascial bands that join it to the neighbouring tissues, must be snipped through with scissors; and in doing this, care must be taken not to cut all the ligament away. In two cases I found the ligaments so brittle that they would not pull out. In both, adhesions had occurred on one side of the pelvis, and in both the opposite ligament was so strong as to answer the purposes of both up to the present time. Before attempting the operation, I would recommend all surgeons to practice it on the dead subject, or see it done again and again on the living. It is very easy to perform to those familiar with it, but very difficult to those who have very little idea of the appearance of the structures they seek, and of their exact location.

In the second place, the operation is a plastic one, inasmuch as to be successful the round ligaments must be made to ad-

here firmly to the pillars of and structures in the neighbourhood of the external abdominal ring. I now invariably obtain the necessary union by the means already mentioned—viz., deep-placed catgut sutures tied loosely but securely, so as neither to constrict the ligaments and produce sloughing, nor to let them go till union has taken place. Drainage to prevent tension is absolutely necessary for a few days. I now rarely cut off any of the ligaments, but pack the loose tissue in the wound piercing it with the skin sutures.

As to the treatment of retroversion or of prolapse, I have now said all that need be said. In cases of old standing, the

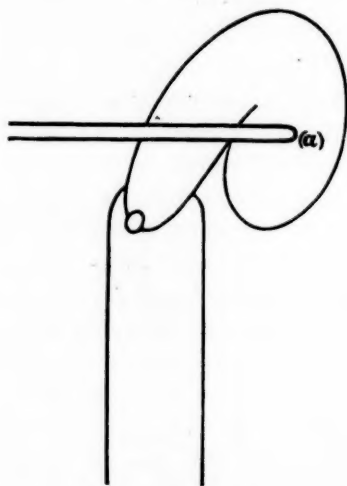


FIG. 1. DIAGRAM SHOWING A CHRONIC RETROFLEXION OF THE UTERUS AND THE POSITION OF THE ROUND LIGAMENTS.

fundus becomes abnormally developed through congestion, and the round ligaments become withdrawn towards the cervix in their place of attachment to the uterus. The three following woodcuts, from my work on this operation,¹ will illustrate better what I mean than any prolonged description. In such cases, the stem pessary must be retained until the fundus is restored to the normal, and the round ligament has receded in its attachment, so as to thoroughly control the tendency to curvature.

¹*Shortening the Round Ligaments.* Alexander. Messrs. J. & A. Churchill, London, 1884.

For this purpose it is necessary to wear a Hodge and a stem pessary for about two months. I use at first a long galvanic stem, and afterwards a shorter glass one. I consider six weeks about the time necessary to use them, but a great deal will depend on the chronicity and inveteracy of each case.

The evidence I have just given of the permanent utility of

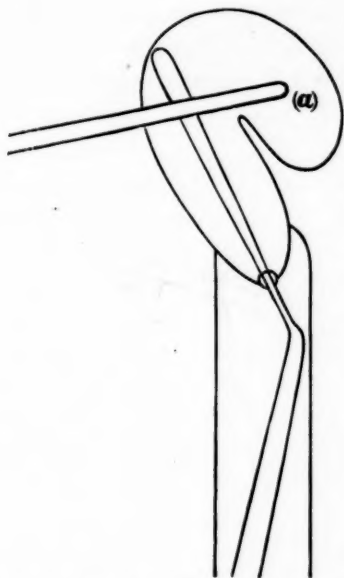


FIG. 2. DIAGRAM SHOWING THE EFFECT OF PULLING ON THE LIGAMENTS ALONE, WITHOUT PREVIOUSLY STRAIGHTENING THE UTERUS COMPLETELY BY THE SOUND.

my operation of shortening the round ligaments is, I venture to think, sufficient to produce confidence in it in the future in all who may have suitable cases to which it may be applied. Many men of high position and highly esteemed in the profession have been led at the outset to reject the operation on account of certain theoretical considerations. "The round ligaments," they say, "are very slight structures, too weak to resist the opposing force of a heavy uterus. They are not of any ascertained utility in a healthy woman, and in the dead body would allow the uterus to hang from the outlet of the pelvis without restraint. They might when shortened be of

some use, perhaps, in case where the retentive power of the abdomen is scarcely, if at all, unimpaired, as in these cases very little help is required to keep the uterus right; but in such cases the insertion of a pessary is a much less troublesome, a less painful, and as effectual a cure. In cases where the retentive power of the pelvis for the uterus is almost entirely lost, where strong pessaries are shot out with great force almost as soon as applied, how could delicate bands like the round ligaments resist such a strain, even for a very short time?"

To these theoretical objections—the result of ignorance not

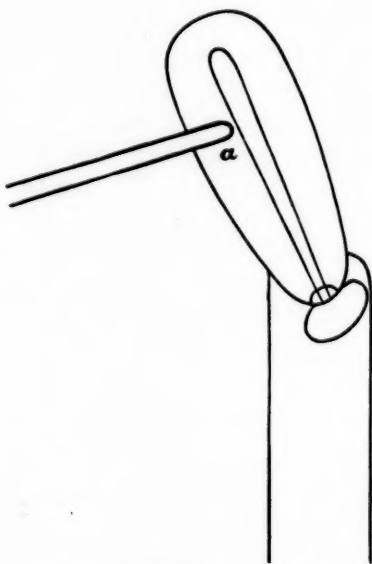


FIG. 3 DIAGRAM SHOWING UTERUS STRAIGHTENED BY A STEM PESSARY.

only of the *modus operandi* of the operation, but of the anatomy and physiology of the pelvic viscera—I might content myself with a reiteration of the statement that the uterus does not come down after the operation, even in such neglected cases. In my small work upon the operation, I dwelt very shortly upon the theoretical part of the subject, thinking that a hint to gynæcologists of its *modus operandi* would be sufficient to enable them, with their extended knowledge of the pelvic viscera, to grasp the subject even better than I did myself.

The reviews and verbally expressed criticisms show that this is far from being the case. I will now endeavour to explain it a little more fully.

The cavity of the pelvis, as it presents itself to us on the post-mortem table, is divided into two compartments by a partition that runs across it, composed of the uterus, in the centre, and the broad and round ligaments that run from the uterus to be attached to the sides of the pelvis and to the external abdominal ring. The neck of the uterus is firmly fixed in its position by peritoneal and fibrous tissue mooring it, as it were, in its place by bands from different parts of the pelvis; and it is by these connections of the cervix, as well as by the obstacle called the perineal body, that an artificial prolapse in the dead subject is principally prevented. When the pelvis is emptied of small intestines, the uterus has nothing above the cervix to support it but its own consistence, the broad and round ligaments allowing us with the hand to antevert, retrovert, or to cause a prolapse at will. It is, however, manifest that no prolapse can take place as long as the longitudinal axis of the uterus is maintained at right angles to the same axis of the vagina. And we have first to enquire as to the force that keeps the uterus in that unstable position, since the ligaments just mentioned appear so incapable of doing it, and yet the uterus is kept pretty constantly in one position. My reply to the enquiry is, that the small intestines and the rectum, by filling up the compartments in front and behind the uterus and broad ligaments, effectually maintain this position of the uterus. The round ligament lies in the upper margin of the broad, and is a muscular structure. In the dead subject it is generally more tense than the margin of the broad ligament. When either pelvic compartment is distended with intestine, the depth of the compartment is more distended than the surface; hence the uterus is either pushed forwards and upwards or backwards and upwards by the hydraulic force of the enclosed intestines. The intestines generally go in greatest bulk behind the uterus, because the rectum leads the way, and by the passage of its contents lifts the transverse curtain, so as to invite, as it were, the entrance of the small intestines. But in some post-mortems I have found all the intestines in the anterior

compartment, filling it completely, so that the uterus lay well in the hollow of the sacrum, and was slightly anteverted (not retroverted, as some might expect), owing to the tension of the round ligaments and of the margin of the broad ligament along which it ran. During the quiescent condition of the pelvis the antero-posterior position of the uterus fluctuates constantly within a certain small arc on account of the restless nature of the intestinal contents by which it is surrounded and supported. If itself top-heavy, or dragged backwards by an enlarged ovary, or an entangled Fallopian tube, the uterus may then be at once dislocated backwards by the direct and sudden action of the pelvic intestinal coils. These through the suddenness of the action, produced by an awkward thrust or strain, have not time to insinuate themselves in force behind or in front of the ligaments, but in their rush downwards catch the declining uterus full on the fundus and push it down. Many cases of such dislocations undoubtedly recover spontaneously partly through the insinuation of the intestines into their normal places, and partly through the natural recoil of the womb. Most cases of uterine displacement arise, however, from a weakening of the perineum by which the vaginal axis is at first changed rather than the uterine one, and the uterus becomes inclined backwards more than is normal through slipping forwards of the cervix. The force of the intestines that formerly kept the uterus right, now favors the increase of this displacement. Having once approximated the direction of the axes of the uterus and vagina to each other, the wedge-shape of the uterus comes into play, and backed up, as it now is, by the intrapelvic forces, inevitably produces prolapse sooner or later, and to a greater or less degree. When the retroversion becomes very marked, prolapse is not so likely to occur, but rectal trouble arise. The uterus lies on the wall of the empty and collapsed rectum pushing forward its mucus membrane, like a valve, and obstructing the passage of the intestinal contents. The pressure of the rectum from above, not only constantly aggravates the uterine displacement, but strengthens the obstruction by pushing the uterus more and more into the rectum. Hence the lesions produced by retroversions are generally gross ones that do not depend on some

mysterious influence of the abnormal flexure of the uterine canal, but upon distinct interferences with the physiology of the pelvis. It is also no less true that versions and flexions may occur without the production of any symptoms whatever, but such cases do not require any operative attention, and are outside the scope of this paper.

If the principles enunciated above are true as to the efficacy of this midriff of the pelvis in maintaining the position of the uterus, how is it that a simple replacement of the uterus by the sound does not cure displacements? Simply because we cannot, by that means, erect at the same time the broad ligaments, and the action of the intestines upon them in their still altered position, pulls the uterus back immediately. For the same reason intra-uterine stems and pessaries can only keep the uterus up as long as they are in position. The elastic recoil of a long flexed uterus, as another cause of recurrence of the displacement, is exemplified by the necessity of supplementing my operation by an intra-uterine stem in retroflexed cases until this recoil is destroyed.

By shortening the round ligaments, I not only bring the uterus into its normal position, but bring into position also the displaced broad ligaments so that the intestines enter behind them and supplement their action, as it was philosophically intended in the normal state they should. Prolapse becomes impossible if the operation succeeds as an operation, because the uterus cannot prolapse while its position is at right angles to the vagina, and the operation should always so place the uterus and broad ligaments that the axis of the womb is at right angles to the vaginal axis, even, although the perineal body is destroyed. The intrapelvic forces now drive the uterus towards the pubis where the bone prevents any tendency to protrusion. The uterus being placed in the new position, for it is a new position, being always a little forward and downwards of the original normal position, there is really no more strain upon the round ligaments than there was of old upon them. They merely move the nicely balanced, floating uterus, and the effect of natural straining is to release them from tension rather than to increase the tension, because natural straining presses the uterus towards the pubis, and

hence relaxes the ligaments. It is only when the abdominal pressure is relaxed, and in certain positions of the body that any strain upon the ligaments takes place. This strain is not one of bearing the weight of the uterus, but of merely maintaining its erect posture, and we all know how much easier it is to keep a ladder erect by the hand than it is to carry it. For all necessary purposes connected with the operation, the round ligaments are more than sufficient, and one would always suffice as far as strength is concerned. If, however, we pull one up in the dead subject, we find the broad ligament on that side well placed, the uterus hanging away, and the opposite broad ligament is twisted backwards. The intestines run behind the broad ligament and uterus on one side, and over the broad ligament and uterus on the opposite side; one-half tends to beat the womb down, and the other half to support it. In three of my cases, with only one ligament shortened, success has hitherto followed, but it will be seen at a glance, in how much better a position we are in with both shortened. Then I believe, from both theoretical and practical experience, that it is impossible for failure ever afterwards to occur.

Stretching of the vaginal walls, and consequent cystoceles and rectoceles, are not cured by this operation. The round ligaments then, indeed, would have to bear an enormous weight, such as some critics suppose my operation always imposes upon them. I have never yet been called upon to operate on a cystocele or rectocele after the round ligament operation, as the patients once being assured that the womb was safe, were no longer troubled either mentally or physically by the bulging into the vulva of the vaginal mucous membrane. This bulging gradually lessens, if the patient and doctor are so well advised, as to leave it alone without aggravating it by the use of pessaries.

Another objection to the operation consists in the supposed repugnance of patients to submit to it. I do not think this is at all a serious one, when once the patients are convinced that it is safe and effectual in freeing them forever from the intolerable trouble of being always treated with pessaries.

As to the length, I pull out the round ligaments; I always

now pull them out as far as they will come without resistance. As soon as they are released from the external rim they pull out with the greatest of ease for about three inches, and then resistance is felt. I always stop when I feel this resistance and stitch them up. In the case mentioned in my book where pregnancy and parturition, occurred without any trouble, and the womb afterwards maintained its position, the round ligaments were well pulled up.

No argument, therefore, against the shortening of the ligaments, can arise from imaginary troubles, that theoretically might supervene in child-bearing women.

VENOUS-BLOOD TUMORS OF THE VAULT OF THE
CRANIUM COMMUNICATING WITH THE INTRA-
CRANIAL VENOUS CIRCULATION, ESPE-
CIALLY THROUGH THE MEDIUM OF
THE SUPERIOR LONGITUD-
INAL SINUS.

[Continued.¹]

By WILLIAM M. MASTIN, M.D.,
OF MOBILE.

II. ETIOLOGY.

IN the etiological study of these venous formations are encountered marked difficulties and drawbacks; for, indeed, such obscurity surrounds this portion of the subject that, excluding those cases resulting from *direct* traumatism, any examination can be conducted alone upon an absolutely theoretical basis.

I. In the grouping which, for apparent etiological reasons, I have found expedient to adopt, *Class I, or Cases of congenital origin*, comprises five examples (including the brief and unsat-

¹ Continued from p. 340.

isfactory one of Bérard), and in two only (Busch's and Flint's) are there the slightest data to indicate, even approximately, the manner of inter-communication existing between the growth and the sinus.

Therefore, with this exceedingly limited knowledge of their anatomical characters, nothing can be stated with positiveness as to the cause or method of their formation, and the following theories, some of which have been advanced already, are only now proposed as being in the line of probabilities.

(a) Of these hypotheses the most specious seems to be that of the absorptive action of the *glandulæ Pacchioni* upon the walls of the sinus and the cranial parietes. Dr. Gross (with others) asserts that, "the most common cause of the abnormal communication is spontaneous, progressive absorption of the osseous tissue corresponding with the Pacchionian depressions, when, under the influence of slight traumatism, the blood escapes beneath the pericranium."¹ * * * *

This assumption is strengthened when we consider the numbers of these granulations or glands within the cavity of the longitudinal sinus and upon the dura mater in its vicinity (notwithstanding that their microscopical presence in infancy is denied by many physiologists), and the activity of all cell proliferation, especially in glandular structures, and under morbid influences, in early life. But in congenital cases it seems to be essential that the absorptive action which these bodies are supposed to produce be carried on to complete perforation, without the requisite agency of slight external traumatism, to effect the escape of blood from the sinus.

In further support of these views I may refer to those obscure alterations and perforations occasionally met with in the petrous portion of the temporal bone, sometimes opening the tympanic cavity, which, according to Luschka, like the *fovæ glandulares* of the calvarium, are not improbably the result of pressure exerted by these villous-like vegetations.

(b) Secondly, the aneurismal dilatation of a vein passing from the longitudinal sinus through the bone—many of which veins pierce the skull on each side of the tract of, and communicate with, this canal,—suggests itself in this relation, and to

¹ Loc. cit.

which the case of Flint might be regarded as having some slight resemblance. But opposed to this, and, indeed, to any form of venous varix, is the extreme, if not absolute, rarity of of such a venous aneurism in this region, not to mention the absence of all aneurismal symptoms of a decided character.

This method of communication, however, is maintained by Dupont to exist in some instances.

(c) Certain constitutional or hereditary diseases should not be overlooked as very possible etiological factors.

Hereditary syphilis or the rickety diathesis occasionally finds expression in the production of craniotabes, where areas or spots of softened and thinned osseous structure take place in the cranial walls, only requiring some slight internal or external pressure to convert them into veritable skull perforations. Although this condition is but seldom observed congenitally, occurring principally in syphilitic infants during the first year subsequent to birth, yet it is worthy of note that this sometimes does happen; that the inner cranial aspect is usually the primary seat of attack; and that they are generally observed occupying the posterior parts of the parietal bones—about the position where the venous tumor under consideration is, perhaps, most frequent; and, too, in which neighborhood the Pacchionian bodies most abound.

Parallel with this observation the so-called gelatiniform degeneration of the outer table of the skull (Parrot) must be referred to, as offering points for consideration in this study. How far the mere absorptive power of the Pacchionian glands alone, or stimulated by or associated with a systemic vice as above mentioned, or any of these individually, may act, is a question needing for its answer careful and painstaking research.

(d) Finally, developmental arrests (of which the case of Busch is, at least, suggestive), including, also, absence of ossification in the triquetral or Wormian bones, and abnormal fontanelles, must not be ignored in following out this inquiry. Against the latter, however, in those instances where the growth is situated centrally and anteriorly on the head, may be urged their extreme infrequency in the median part of the cranial vault; and here it may be remarked that in the congen-

ital cases the tumor occurred equally in the frontal and occipital regions.

II. An examination of the etiology of *Class II., or Spontaneous Cases*, is met by equal if not greater obstacles than those characterizing the investigation of the first class, since in the present instance there are only the symptoms of the disorder, and these largely subjective, which are available in furnishing any information whatever relative thereto,—again necessitating, of course, a resort to the uncertainty of speculation.

These probable causes comprehend, in the main, those applicable to the congenital group, and have received already a sufficiently detailed notice. Therefore, beyond a simple enumeration of them in the order of their greatest applicability or most probable tenableness, further reference is deemed unnecessary.

Here again the most plausible theory, and the one deserving of first mention, is that of (a) the absorptive action of the Pacchionian glands exerted upon the osseous tables; and, for obvious reasons, is decidedly more applicable to the cases of spontaneous origin than to the congenital form of the disease. In this division is readily understood how *slight* traumatism can occur, which is considered essential to complete the breaking through of those thinned points produced by the localized action of these glands; and here, also, can be found the association of a certain degree of age and growth which anatomy has demonstrated to be favorable, at least, to the development of these bodies,—conditions non-existent prior to birth.

(b) Coming next is the explanation proposed by M. Dufour.¹ He believed the abnormal communication was caused by an obscure form of osteitis, followed by interstitial resorption of bone, the probable consequence of a trivial contusion.² Such an inflammatory process, however, to my mind, presupposes the presence of some constitutional taint which renders the osseous

¹ Loc-Citat.

² Note.—This theory might be regarded, at first glance, as pertaining to the *traumatic class*, since *slight* traumatism in the form of a contusion is one of its essential elements. But whereas the traumatic group is composed of those cases only which are produced by severe and *direct* injury—in a word fracture of the skull,—it is seen that this really belongs to the division (spontaneous) to which I have assigned it.

tissue peculiarly susceptible to the taking on or lighting up of this process upon the reception of the contusing force.

(c) Aneurismal dilatation of a vein passing through the bone into the sinus. The same objections hold good here as in the congenital variety.

(d) Localized diseased processes in the structure of the sinus itself, as in phlebectasia, or in phlebitis, followed by osseous absorption. But the absence of abundant and marked fibrous elements in the formation of the tumor, or phlebectasiac walls, are arrayed in opposition to such action.

(e) Lastly, constitutional or systemic vices—more especially syphilitic or strumous—as manifested in those osseous changes already referred to. In this category should be included any systemic condition predisposing to bone alterations or degenerations in general. And just here it must be remembered that, in the case of MM. Nélaton and Richard (case 2) the growth was not discovered until after a severe illness of the patient at the age of about five years.

III. The same obscurity and difficulty, however, does not obtain of the *traumatic cases, Class III.*, as of the two preceding groups, for in this are included only those instances where the lesion is *directly* traceable to some wound or blow applied immediately to the cranial vault. Traumatism, therefore, occupies here a position so clear and well-defined in the relation of cause, that it becomes at once apparent without any dubious or speculative inquiry.

There are several points, nevertheless, that should be brought into more prominent notice than the mere detail of the clinical histories have permitted, and to which, in this place, a brief reference, at least, is desirable.

These points are the positive pathological characters furnished by the elaborate post mortem examinations accompanying two of the cases, and by the operative surgical measures adopted in another, together with the nature of the injury and the instrument or method by which the wound or blow was inflicted.

Respecting the distinctive features of the injury I may assert that, in each and every instance it was a severe one—a fracturing force—resulting in fracture of that portion of the skull receiving it.

But among the five examples composing this class it is especially interesting to note that four were characterized by the absence of all integumentary wound—being purely *subcutaneous*—and in one only (Hutin's case) was the fracture open or compound.¹

In one of Azam's cases, a boy, the tumor resulted from a kick of a horse, and appeared a few days thereafter, showing that the sinus must have been extensively wounded—probably a sharp fragment of bone puncturing or lacerating it,—as the time intervening between the injury and the appearance of the pouch was too short for absorptive changes to have effected any material alteration of the opening; whilst in his other the blow was produced by a heavy rake handle, but the swelling did not manifest itself until after the lapse of about twenty-five days.

Here the tumor was tardy in visible development, and certain osseous alterations may have modified the orifice between the skull and the sinus as originally produced by the traumatism.

Neither of these afforded a necropsy.

The lesion in Pott's case was caused by a forcible lick with a stick, and which was followed by its immediate appearance. Being mistaken for an abscess by that distinguished surgeon, it was freely incised; but, when fracture was revealed, he trephined the skull over the sagittal suture, finding a splinter of displaced bone directly piercing the sinus.

One case of Hutin, was in the person of a soldier, who received a crushing blow dealt with the butt-end of a musket, producing skull fracture. A post mortem examination fifty-two years subsequently verified the presence of fracture, with an opening in the superior longitudinal sinus; but there existed, in addition, necessarily, certain osseous changes resulting from the length of time of the existence of this abnormal communication. In his second patient the lesion was caused by a sabre stroke, producing a compound comminuted fracture of the cranial vault, with removal of loose bone fragments.

¹ *Note*.—Punctured and other compound fractures of the skull not infrequently result in wounding of the underlying sinus, and, in illustration of this, numerous instances of such an injury have been reported, notably among which are the cases of Gagniere, Lassus, Hennen, and others.

This class of injury, however, does not come within the limit of the present discussion.

Forty years afterwards death resulting from a pneumonia coming on after a fall, an autopsy disclosed a long fragment of bone perforating the wall of the sinus, and thus placing this canal in communication with the external blood-pouch.

Thus the information gained from these cases, and particularly that obtained from the autopsic examinations, is sufficient to render safe the assertion that, in all traumatic cases fracture is invariably present, and in which the wall of the sinus is directly wounded either by (1) a depressed fragment or fragments of bone, (2) lacerated by the separated edges of the fractured bone, especially if the line of fracture passes across the suture, to which the sinus is intimately attached, or (3) torn through by a disunion of the suture over the sinus,—particularly the sagittal suture.¹

III. MORBID ANATOMY.

The classification of this lesion into the congenital, spontaneous, and traumatic forms, is as essential in the study of its pathological anatomy as in the etiological division of the subject; but, our knowledge of the anatomical characters being derived almost exclusively from one class, it follows, necessarily, that we can speak definitely of that one group alone, leaving the others to be dealt with conjecturally or from an *a priori* stand point.

As previously remarked, all the direct light thrown upon the pathology comes from examinations conducted in three traumatic cases, with scant and equivocal information supplied by two congenital instances, without a single gleam from the spontaneous group; and, therefore, all conclusions as to the morbid anatomy of this affection are based, almost solely, upon those cases which are due to trauma.

The points of especial interest in this study, and which comprise those of most importance, are, (1) the general character of the tumor; (2) the relationship of the tumor to adjacent parts, including the nature of the tissues limiting or bounding

¹ *Note*.—Instances of wounding of the sinuses of the dura mater by separation of the edges of a suture, especially the superior longitudinal by disunion of the sagittal suture, have been recorded.

Among others I may refer to the cases of Guthrie and M. Mouton, which have been mentioned already. (Vide note, p. 537.)

it; (3) the tumor contents; and (4) the connecting passage between the cavity of the tumor and the sinus within the cranium.

These I will examine separately, bearing in mind, at the same time, their association with each of the several groups individually.

1. *The general character of the tumor.* This tumor may be described briefly as an indolent swelling in the form of a pouch, external to the skull, composed of one or more cavities, containing venous blood, and in communication, through the bone, with the cerebral venous circulation.

In the *congenital class* the pouch was shown, by post mortem examination, to be single in two cases; and in the remaining two this same arrangement of its cavity was also pretty well assured by the sensation conveyed to the touch upon careful manipulation, both before and after its artificial reduction.

Palpation with other physical conditions indicated very probably the existence of the single pouch or cavity in all of the *spontaneous* cases; although in the patient of MM. Nélaton and Richard, the morbid action evinced a tendency to the production of multiple growths, for a second, distinct, tumor appeared near, and in communication with, the first or original one, after the expiration of several years. Both these primary and secondary formations, however, were evidently of the single cavity variety.

The only case of more than one or several cavities composing the pouch was in one of the *traumatic group*, where the tumor was arranged, apparently, into cells or partitioned cavities communicating with each other. This cellular character was demonstrated by both palpation and puncture with a trocar, combined with gentle exploration by means of a small blunt probe or stylet.

Manipulation demonstrated a single pouch in another of this class, whilst the remaining three were found upon operative and autopsic examination to consist, also, of but one sac. Therefore, I may say, the single cavity is the most frequent, if not characteristic of this venous tumor.

In every instance the tumor was external to the bone, except in one case (traumatic) where it was partly within and partly

without the skull. And, again, all the examinations disclosed the presence of venous blood filling the tumor cavity, and which was in communication, either directly or indirectly, with the sinus. Upon these can be based substantially the opinion that such are the essential physical characters of the growth.

These characters will be the subject of separate and more extensive inquiry as we proceed in the consideration of the affection,

II. *The relationship of the tumor to adjacent parts, including the nature of the tissues limiting or bounding it.* Taking the coverings of the cranium in their order from without inwards, I find the anatomical location of this tumor may be (a) between the integument and the cranial aponeurosis; (b) between the fibro-muscular layer (aponeurosis) of the scalp and the pericranium; (c) between the pericranium and the bone; (d) between the pericranium and the bone, and extending internally between the skull and the dura mater.

(a) Although not determined by actual dissection, the seat of the tumor between the skin and the epicranial aponeurosis is, at least, probable. Clinical observations alone, however, are inadequate to decide this exact seat, because the appearance and sensation of the pouch is not an index to the composition of its coverings, since both the skin and aponeurosis might be so extremely thinned or attenuated as to present to the touch the sensation of only integumentary thickness, and accompanied by a violet color as if the contained blood was immediately beneath the skin.

I am unable to point out any conditions which would render this position or relationship of the tumor more prevalent in one class than in another, unless it be in certain instances where all the tissues of the scalp were originally torn through to the skin; or in those cases where absorptive action is especially prominent as an etiological factor, and in long standing cases with a disposition to rapid tissue change, hastened, perhaps, by increased blood-pressure.

(b) Probably, as it appears, the most frequent seat of this venous formation is its location between the aponeurotic layer of the scalp and the pericranium. This position was indicated, macroscopically, by two *traumatic* instances (cases of Hutin

and Pott), and by puncture and exploration practiced in two others (cases of Azam); and is, doubtless, most often met with in cases of this class, as well as in those of all the groups.

The *congenital* and *spontaneous* classes, although lacking the proof of direct examination, and even the uncertain evidence furnished by puncture and exploration of the interior of the sac, are, very probably, to a large extent, so situated; and especially in their early stages, and where the growth is small and does not manifest a decided or rapid tendency to increase.

(*c*) The situation of the tumor between the pericranium and the bone, and again (*d*) between the pericranium and the bone and extending internally between the skull and the dura mater, may be regarded as exceptional locations; not only on account of there being but single examples of each of these among the present collection of cases, but also from the fact that the weight of probability, furnished by the general study of these formations, together with anatomical testimony, is against such relationships or positions. Furthermore, the etiological conditions of the two instances are diametrically opposed to each other—one being *congenital* and the other *traumatic* of long standing. In recent instances of traumatic origin, however, where comminution of the cranial tables has been produced, both the pericranium and the dura mater may be detached to a more or less extent from their bony attachments; and then one might expect to find the pericranium unglued or floated up by the blood, which had insinuated itself between the osseous tissue and this membrane, thus forming one of the layers of the tumor-wall, and even in connection with a second blood-pouch occupying a seat between the dura and the skull, although these seeming requisites of bone comminution and pericranial separation are not furnished by the histories of the above noted cases representing these locations. Should the coats of the sinus itself become dilated (phlebectasia) and protrude as a hernia through the osseous opening,—which might possibly occur where there was loss of bone substance without direct injury to the sinus; or again, if the tumor was of aneurismal production, as has been suggested, then, of course, there would exist a decided modification in the formation of the tumor; and, under such circumstances, naturally, the walls of

the dilated sinus or aneurismal vein would be superadded to the constituents already enumerated as entering into the composition of the tumor coverings.

Each and all of these tunics forming the walls of the tumor may be normal in texture and in relationship to each other, or considerably modified or changed by diseased or natural processes,—even differing according to the age of the individual affected,—as is exemplified in several of the cases. Again this morbid or alterative action is not limited to the soft structures, but occasionally invades also the cranial surface,—altering it in both quality and configuration.

III. *The tumor contents.*—From what has been said relative to the causes and formation of this growth it is almost needless to remark that, the pouch contains invariably normal, liquid, venous blood.

This was demonstrated by both ante-mortem examinations by means of puncture and evacuation, and autopsies, in conjunction with the histories and symptoms of all the cases.

Moreover, solid elements may be found occasionally within its interior—as shown in one (spontaneous) of Middeldorpf's patients, where a movable, ovoid, cartilaginous-like button, about the size of a rice grain, was distinctly felt,—and which may be formed (condensed) at the expense of the cellular tissue, or even, probably, as fibrinous deposits or concretions (phleboliths) from the blood itself.

In addition the cavity of the tumor may be cellular in composition with trabeculae and cords extending across it, and illustrative of this condition is one of the cases (traumatic) of Hutin.

Finally, it is interesting to notice the difference in the tumor contents after death, revealed in the two cases of Hutin,—in one the pouch being empty, whereas in the other it was filled with a venous blood clot. Dupont endeavors to explain this difference in the contents of these tumors by the position of the head (hanging down) at the moment when life became extinct, or according to the stage of the respiratory act (expiration) at the last moment, in congesting the tumor and thus facilitating the formation of a clot.

IV. *The connecting passage between the cavity of the tumor*

and the sinus within the cranium.—That the blood of this tumor communicates with the intra-cranial venous circulation has been clearly proven, and it has been demonstrated, also, that the means or method by which this communication is effected, is through an abnormal opening perforating the bony parietes and emerging into the skull cavity; and, therefore, it is only left now to consider the character of this passage or communication.

With those etiological and pathological facts before us which the previous study of the lesion has rendered conclusive, it is to be expected that the cranial opening will differ in the several classes or groups, and vary to a like extent in each individual case; for, taking as an example the traumatic group, which is more conspicuous than the others, the size, shape, number, and direction of the orifice is absolutely dependent upon the extent and character of the injury producing it. Hence no definite characteristic of this aperture can be noted besides its connection or association with the sinus.

It is well to revert, however, to the fact that the communication may be either *direct* or *indirect*. The direct method, where the cavity of the tumor communicates immediately with the sinus through the cranium, is well exemplified in the *traumatic* cases of Hutin and Pott, and the *congenital* one of Busch, in each of which it was practically observed. But in the indirect communication the direction and extent of the passage is changed, or irregular—even tortuous,—and reaches the sinus only after traversing other tissues besides the bone, or it may form a distinct canal of some length. This is exhibited in one of the *traumatic* cases of Hutin, and, probably, in the *congenital* instance of Flint; in the latter the connection with the sinus being, in all probability, through the medium of a meningeal vein.

Taking the relative frequency of the direct and indirect methods of communication into consideration, although after eliminating the evidences of surgical and post-mortem demonstrations, an intelligent appreciation of the histories and symptoms presented by the cases speaks for the first or *direct* connection of the tumor cavity with the sinus.

IV. SYMPTOMS.

The symptoms can be divided into (1) general and (2) local.

1. The *general* symptoms are few in number, inconstant and variable—some patients not experiencing the slightest general discomfort or inconvenience,—and are of that character which might be anticipated from the location and nature of the tumor.

Of these *vertigo* or *dizziness* is the most prominent and most constantly present.

In the majority of instances this symptom was encountered, especially when the tumor was at its maximum volume, but not always appearing spontaneously, and more often the result of posture with the head dependent or flexed; or produced by compression of the growth, particularly if the pressure was such as to cause the rapid emptying of the pouch of its contained blood, although, on the other hand, in some cases supporting the tumor may lessen or relieve the vertigo.

In one case (Larrey's) compression of the pouch, in addition to vertigo, caused a mistiness or indistinctness of the vision of the eye corresponding to that side on which the tumor was situated; and in one or two patients these symptoms of dizziness resulted also from any cause whatever that would produce increased blood-tension, such as a distended stomach, muscular exertion, and certain mental emotions. In two instances again nausea and vomiting, together with "lightness" and swimming of the head, came on after repeated and prolonged manipulation of the growth.

It is possible for pressure upon, or forcible reduction of, the tumor to produce symptoms of cerebral compression, as is vaguely referred to in the traumatic case of Hutin and the spontaneous case of Larrey. But, it should be added, this occurred only under certain circumstances, or in rare cases, and cannot be regarded as one of the symptoms ordinarily attending this lesion.

Pain is much less frequent than vertigo, and finds expression chiefly in the form of headache.

When present it usually accompanies increased tension of the tumor, that is when largely distended; but in some instances pain was only produced by pressure exerted upon the tumor. And in one case (Verneuil's) headache was peculiarly severe at the menstrual epochs; however, in the face of the

many and varied nervous phenomena and perturbations so often met with at these periods, this symptom is of no significance.

Pain localized in, or confined to the vicinity of, the growth has not been recorded.

2. The *local* symptoms are much more characteristic and reliable than the general ones, and, for convenience of study, may be subdivided into, (a) symptoms furnished by inspection, and (b) those elicited by palpation and manipulation of the tumor, including auscultation.

(a) *Symptoms furnished by inspection.* The first point, and one of considerable importance, to be observed in an examination of this growth, is its *seat* or location.

As would be naturally looked for, this is situated nearly always in the tract of the sinus or adjacent thereto; and, consequently, the proximity of a swelling to the course of the superior longitudinal, or, indeed, any of the cranial sinuses, especially if presenting doubtful or obscure symptoms, should be, at least, suggestive of this variety of tumor.

An analysis of the cases shows that the growth is encountered in the frontal, parietal, and occipital regions, and these positions are distributed among the three classes as follows: The *congenital* group numbers four cases, two being in the frontal region—one to right and one to left of median line, and two in the occipital region; the *spontaneous* group includes four cases, one occupying the left side of frontal region, and three the occipital—one on left side and two in middle line; and in the *traumatic* group there are five cases, of which four were situated in the frontal—two to right of and two in the middle line, and one on the summit of the head or in the middle parietal region.

The *size* of the tumor, even when distended to its fullest capacity, is usually of moderate dimensions, the largest size being attained in the patient of MM. Nélaton and Richard (7½ cm. in diameter at its base by 2½ cm. in height); and in the quiescent state, that is when the swelling is relaxed or at its minimum enlargement, the growth is quite small, and in some instances almost, if not completely, imperceptible.

These changes or alterations in the size of the tumor are especially characteristic, and can be seen frequently to take

place under those conditions influencing its distension and relaxation;—the pouch slowly rising and swelling up in the dorsal decubitus or any position with the head lowered; by interference with the intra-cranial venous circulation, as occurred, for example, in two cases where the jugular veins were compressed, and in crying, coughing and sneezing; sometimes by a full stomach, muscular exertion, or mental emotions; and, possibly, during the normal respiratory effort;—however, under converse influences or these conditions lessening expansion and dilatation, the tumor is observed to recede gradually to a lower level, and often entirely disappears.

The *color* of the swelling is usually normal and does not differ from the healthy skin in the region where it is located. But, in a measure, the color is influenced by the consistency or thickness of the tegumentary coverings, and may vary with the degree of distension, for when the walls of the tumor are very thin it may assume a purple or violaceous hue, or again being changed in color whilst distended this discoloration may fade away with the relaxation of the tumor. In one case it was of a deep red, and in another there were several dark bluish spots on its surface, giving it the appearance of a capillary *nævus*.

As a rule the *surrounding* skin remains unimplicated, unless the lesion be complicated by the association of some disease of the integument—a complication much more likely to occur in the *congenital* than the other classes.

(*b*) *Symptoms elicited by palpation and manipulation of the tumor, including auscultation.* The influence of *head posture* on the volume and resistance of the tumor is even more apparent to the touch than to the eye; and, as it is manifested always, perhaps, in this affection, the symptom of *dilatation* and *reduction* produced thereby as furnished by palpation may be reasonably regarded as a pathognomonic character, and hence, should have assigned to it a position of prominence.

Without an exception, as far as tested, this influence of position was decided and marked,—the tumor being felt to attain its greatest or maximum volume when any position with the head lowered was assumed, and even simply bending the head forward producing very evident increase of size and tension;

whilst the reverse attitude, with the head fixed and erect, being attended by a diminution in both resistance and bulk, and in some instances the tumor subsiding so completely as to be positively indiscernible upon the most careful palpation.

Palpation shows that a similar result is produced by *compression of the jugular veins*, or any interruption whatever of the cerebral venous circulation; and, indeed, anything which materially or decidedly increases the blood pressure, as forced expiration in coughing, muscular exertion, crying, etc., etc., as enumerated in the preceding section, would at once impart to the hand a like sensation; the contrary, of course, taking place under opposite conditions.

Although pressure upon the jugulars was employed in only two instances, the influence upon the growth was unequivocal, and may be taken as a rational symptom, and one of value when associated with additional evidences; for, it is needless to remark, its range of applicability is much too wide and extended to be by itself of diagnostic import in this form of sanguineous tumor of the skull.

Probably next in importance to postural influences may be regarded the symptoms of *compressibility* and *fluctuation*, which taken together furnish positive evidence of a fluid-containing pouch or cavity, and the fluid of which having an intracranial outlet.

In all of the cases, seemingly irrespective of cause, compressibility of the tumor was present and one of the chief characteristics,—the growth readily and completely but slowly subsiding under continuous lightly made pressure with the hand or fingers, and tardily redilating upon the removal of the compressing force,—distinctly conveying to the touch the sensation of a sac gradually being emptied of fluid. The rapidity with which this evacuation is accomplished must be dependent, necessarily, upon the freedom and directness of the communicating passage with the interior of the skull, but, as a rule, the reduction is slow and gradual.

Notwithstanding the assertion of M. Dupont (op. cit.) that fluctuation was observed in only two cases in his collection, I am inclined to believe, after an attentive examination of these cases, that, on the contrary, it really did exist in all of them

except the patient of Azam (traumatic), in whom the tumor had a soft and spongy feel; and, therefore, I must attach a significance to fluctuation far above that which he accords to it.

Another symptom of especial weight is the ability in many instances to recognize by the finger, after the reduction of the growth, some bone alteration, or even the depression or indentation in the skull corresponding to one or more openings leading to its interior, which in several cases were of sufficient dimension to admit the tip of the finger.

Furthermore, in a few instances *puncture* by means of a trocar and canula, with direct exploration by a stylet passed through the canula, disclosed the existence of these apertures where they had eluded careful digital search. However, even where this latter measure was employed, failure to detect the osseous perforation resulted in one or two cases, in which a subsequent incision or post-mortem examination disclosed its presence; and hence such unsuccessful efforts to discover the communicating entrance should not be considered as conclusive of its non-existence.

The *sensation* or feel of the walls of the pouch and adjacent integument are of value in considering the symptoms of the affection. In uncomplicated cases, after the pouch was emptied, this gave to the finger the sensation of a loose, lax, movable covering of healthy tissue, of different degrees of thickness according to its constituents, with a normal feeling of the surrounding skin; but in the one instance above referred to (Azam's case) the sensation was that of a spongy mass within the skin sac.

Pulsation, although noted as occurring in the patient of Pott, may be looked upon only as an exceedingly infrequent accompaniment, and indeed, can be entirely eliminated from the list of symptoms.

The very nature of the formation, together with the anatomical characters are, under ordinary circumstances, opposed to such a symptom, and in this instance of Pott I think the pulsation was due either to a respiratory rise and fall, or, if synchronous with the cardiac action, to the cerebral pulsation imparted to it by contiguity through the fracture.

The same observation applies to a *bruit* or aneurismal murmur.

It is true that Azam claimed to have detected in one of his patients a blowing murmur; but this could not be verified by his colleagues; and, moreover, it was audible only when the tumor was quickly and forcibly reduced, and seemed to be confined to the tract or line of the sinus. In no other instance was any blood sound discoverable.

Finally, a symptom of no insignificance is the fact that, cutting off the external or superficial venous circulation, after the growth has been reduced, by means of a band or cord tightly drawn around the head, or by a ring closely encircling the base of the tumor, is followed by an immediate refilling and expansion of the pouch when positions favoring or producing such expansion are assumed; and again this circular compression being applied whilst the tumor is fully distended, complete reduction is, as usual, produced by gently made pressure.

By this means the external venous blood current is largely separated from the internal or intra-cranial venous circulation, thereby enabling one to decide with which system of veins the tumor is connected.

This method was employed in but two cases. In the case of Middeldorpff it was accomplished by an ivory ring pressed down around the base of the tumor; and in the other, the patient of MM. Nélaton and Richard, a band encircling the head with graduated compresses in the temporal fossæ effected the required constriction.

V. DIAGNOSIS—DIFFERENTIAL DIAGNOSIS.

In the majority of instances the diagnosis should not offer features of grave doubt or obscurity.

The history of the lesion, especially when the result of trauma; its location, want of marked elevation, and slow progress; the usual unchanged color and texture of the integument surrounding it, and, more frequently than otherwise, of the tumor-wall itself; the direct influences of posture, coupled with those resulting from pressure exerted upon the jugular veins; compressibility of the growth—its easy and complete but slow evacuation; fluctuation; the recognition by the finger or exploring needle of bone alteration, and very often of apertures perforating the skull; the absence of both bruit and pulsation; the effect of the application of circular compres-

sion; vertigo produced by certain positions and movements; and lastly, the demonstration by aspiration or puncture of the presence of venous blood occupying the cavity of the pouch, constitute a symptom-group scarcely admitting of misinterpretation.

But, it must be remembered, this complexus of symptoms is representative of an uncomplicated or typical example of this formation, and since some cases do not exhibit them either in the prominence or clearness as here set forth, it is evident that there must be instances where the diagnosis is not so easily determined as might appear, and in which the disease may be justifiably confounded with other tumors of the cranial vault.

It will not be amiss, therefore, to refer briefly to the principal lesions presenting symptoms in common with this one; or, at least, those which might arise for discussion in an accurate differentiation.

Thus, in the *congenital* class of this affection there are found, as bearing a certain degree of similarity, the malformations of (*a*) meningocele, and (*b*) encephalocele, to the former of which the case of Middeldorpf offered many points of resemblance; (*c*) cephalhæmatoma, as illustrated by Busch's patient; (*d*) subcutaneous venous erectile or vascular tumor (including, possibly, the capillary variety), of which the patients of Verneuil and Middeldorpf are examples; (*e*) lymphatic vascular tumor; (*f*) congenital cystic tumors; (*g*) venous aneurism, as evidenced in the case of Flint; and, under rare circumstances, (*h*) an abscess, especially where skull-perforation has taken place.

In the *spontaneous* class, the most conspicuous are, (*a*) subcutaneous venous erectile or vascular tumor of the scalp alone; or (*b*) the superficial nævus coexistent with meningocele and encephalocele,—exemplified in the patient of Larrey; (*c*) venous aneurism; (*d*) rarely, aneurism of the middle meningeal artery associated with bone erosion (Dupont); (*e*) fungus of the dura mater; and (*f*) circumscribed abscess.

The *traumatic* class presents numerous symptoms in common with, (*a*) hæmatoma, both within and without the skull,¹ of which an example is furnished by the case of Pott; (*b*) subcutaneous venous erectile or vascular tumor of the scalp, as

¹ Vide cases of Guthrie and Mouton, to which reference has been made already.

seen in one of the patients of Azam; (c) venous aneurism, resemblances to which were manifested in another case of Azam and one of Hutin's; (d) traumatic cephalhydrocele;¹ and (e) circumscribed abscess of the scalp,—one of the cases of Hutin being mistaken for such a pus-collection.

A little care, however, should enable one to eliminate all questionable points; but in those instances where an individual case offers specially confusing difficulties, the demonstration of a fluid-containing-pouch, completely reducible under lightly applied pressure without producing cerebral irritation, influenced by posture and circular compression, and of which tapping or aspiration shows the fluid to consist of living venous-blood, would be quite sufficient, against otherwise doubtful or opposing symptoms, to establish the diagnosis.

VI. PROGNOSIS — PROGRESS.

As far as life is threatened, or even serious impairment of health is concerned, the prognosis is favorable, and equally so in all the classes of the disorder; but when a cure or permanent dissipation of the growth is considered, then the prognosis must be regarded in an unfavorable light, or, at least, is exceedingly uncertain. This conclusion is based upon the fact that, in all those cases where no active surgical treatment had been employed, and which were followed up for a longer or shorter period, the progress in each was slow,—there being but little tendency evinced to any increase in either bulk or symptoms.

Examining these in their respective groups, it is found that in the *congenital* class, the case of Middeldorpf progressed slowly and was almost unchanged after the space of fourteen years; and that of Verneuil also advanced tardily, and resulted in spontaneous cure after a long examination, including repeated palpations, in the seventeenth year of its existence.

¹ This interesting lesion is the subject of a communication by P. S. Conner, M. D., read before the Amer. Surgical Association, meeting of 1884, and published in the Amer. Jour. Med. Sci., July, 1884; and Medical News, July 19, 1884; also in Vol. II. of the Transactions Amer. Surg. Association. See also Dr. A. v. Winiwarter, Archiv für klinische Chirurg, 1884, B. 31, H. I., who reported his case at the German Congress of Surgeons, April 19th, 1884.

This slow progress was also characteristic of the *spontaneous* class. In C. H. Mastin's patient there was only slight increase after five years; in Larrey's case it had grown but little in the twelve years subsequent to its discovery; and in the patient of Nélaton and Richard the progress was slow for twelve years, then for the next four years it grew steadily and rapidly, at which date its dimensions were increased in all directions and with the formation of an additional or secondary tumor, but without a change or increase of the symptoms previously manifested.

In the *traumatic* class, this is again borne out by the two cases of Hutin, in both of which the lesion was under careful professional observation for forty years or more, and hence the slow progress is well authenticated.

Among those instances where surgical interference was adopted are, first, the case of Flint (congenital), where death resulted from hemorrhage after free incision; secondly, the two patients of Azam (traumatic), upon whom repeated punctures were practiced for diagnostic purposes, and in which, after four years and eighteen months respectively, scarcely any change had taken place; and thirdly, the case of Percival Pott (traumatic), where incision and trephining, although attended by profuse hemorrhage, resulted in complete recovery.

Thus it has been clearly shown by these examples that, the malady, *per se*, does not incline to a fatal termination; that the affection progresses slowly in the majority of cases even where no surgical measures for controlling or repressing its growth are resorted to, and without any marked interference with the health or comfort of the patient; and furthermore that spontaneous cure is possible, and hope of recovery is held out by judicious operative interference, notwithstanding that in the case with this favorable issue the surgical procedure was undertaken without recognizing the true character of the lesion.

VII. TREATMENT.

The several methods which have been resorted to in the treatment of this variety of sanguineous tumor are to be classed into, first, the *palliative*, where protection of the part

against injury or external influences, or even to limit or stay its progress, was afforded by a suitable shield or protector; and secondly, the *curative*, including (a) complete compression of the swelling by direct pressure, and (b) operative procedure.

1. Palliative measures were instituted in all the cases with only a few exceptions. And in this connection, Dr. Gross remarks: "The treatment is entirely palliative, consisting in the protection of the part from accident by the application of a compress and suitable straps."¹ And Dupont,² also, declares that the treatment consists only in palliation.

It has been seen, however, that such methods have scarcely exerted any influence whatever over the progress of the growth.

2. (a) Firm compression as a curative measure was employed in three cases, but without success.

M. Azam, in one of his patients, after puncturing the pouch, applied steady and continuous pressure for the period of twenty days, but no appreciable impression of any kind was made upon the tumor, and the patient was discharged in an unbefitted condition. Hutin also used compression by leaden and silver plates without effect; and the efforts in the case of MM. Nélaton and Richard to dissipate the lesion by regulated pressure likewise proved futile. However, the fact must be referred to again, as being closely related to compression, that in Verneuil's patient the tumor subsided spontaneously after a prolonged examination by several physicians, during which repeated manipulation and palpation of the growth was employed.

(b) Operative interference was resorted to in but two instances, although puncture as a diagnostic test was made in two others. In the little patient of Flint a free incision was made, largely dividing the tumor, and profuse hemorrhage and death therefrom was the immediate result; and in the case of Pott, under a misapprehension of its real character, incision and trephining were employed, but was followed by prompt and permanent recovery. These two cases represent the character and extent of the operative treatment adopted; and the obvious reason why such procedures were scrupulously avoided

¹ Op. Citat., p. 28.

² Loc. cit.

in the management of this affection can be readily discovered in the dangers which formerly were anticipated and dreaded from the injury of any large venous trunk or branch, and especially when so intimately associated with the central nervous system as in the meningeal sinuses. Whilst these dangers must be still accorded surgical prominence in the wounding of a vein of the first magnitude,—and among the principal of these are, entrance of air, hemorrhage, phlebitis, resulting in thrombosis and embolism, septicæmia, and, in the present instance, grave cerebral perturbations and meningeal inflammation,—the modern system of dealing with all traumatisms, combined with our recent enlightenment of the tolerance of veins to surgical manipulation, has put quite a different phase upon many of these once feared complications. Therefore the risks of inflammatory and septicæmic manifestations do not require any special consideration in this discussion. The entrance of air is a peril which does not obtain to a greater degree in the wounding of the superior longitudinal sinus than of other important venous conduits,—those of the cervical region, for example,—and hence need not occupy us further than to mention that, in none of the cases was this accident encountered.

Hemorrhage as a notable danger is, I think, more fancied than real, or, at any rate, greatly exaggerated.

It is true that a fatal issue was speedily produced from loss of blood in Flint's case, but this occurred in the person of an infant only a few days after birth, and the knife, evidently, was used recklessly. However, in the two cases of Azam, where frequent punctures were employed; in the patient of Hutin, where incision freely opened the swelling; and in Pott's case, upon whom incision and trephining was practiced, although bleeding was profuse, it was easily and promptly controlled by simple compression. In confirmation of the comparative ease with which, as it would appear, hemorrhage from this source can be staunched, I may mention a recent paper¹ of much interest, by Mr. Hector Cameron, in which he points out that very slight pressure is necessary to stop hemorrhage from a wounded cerebral sinus. Again, as pertinent to the subject of the oper-

¹ *Lancet*, May 24, 1884.

ative treatment, and just here to that of hemorrhage, I must refer to the unique and important case¹ reported by Dr. Charles T. Parkes, of Chicago, where a compound comminuted and depressed fracture of the skull over the right parietal bone was sustained, accompanied by wounding of the upper wall of the superior longitudinal sinus to the extent of admitting the end of the little finger; and upon whom at first a compress arrested the terrific hemorrhage, and then later the removal of osseous fragments and the introduction of three fine cat-gut sutures permanently controlled all bleeding and entirely closed the rent. Furthermore, notwithstanding that by thus coaptating the edges of the wound, the "calibre of the sinus was reduced fully one-third," and a "well-marked bulging" of the sinus taking place at the anterior extremity of the closed wound, resulting from distention by pressure of the backward blood-flow, there was not the slightest indication of cerebral disturbance² traceable to this marked interference with the natural movement of such a large column of blood,—the case terminating in recovery under antiseptic precautions.

Hence, in addition to the valuable lesson here taught relative to the ligation or suturing of the intra-cranial sinuses, we have positive demonstration that the brain will suffer a decided interruption in its vascular supply without evincing any appreciable alteration in its normal functions. Therefore, besides furnishing a response to several questions which naturally arise in considering the proper plan of treatment to be instituted in these venous tumors, this record of Dr. Parkes is a revelation in general cerebral surgery, and forms a strong link in the chain of facts and possibilities which continued experiment and investigation are disclosing in the surgical treatment of fracture of the skull, and diseases and injuries of its nervous and vascular contents.

Consequently, whilst hesitating in the present state of our knowledge to declare the knife and the suture or ligature as constituting the character of treatment called for in this class

¹ *Annals Anat. and Surg.*, Vol. VIII., p. 118.

² Nervous symptoms were present immediately after the injury, and persisted for some time, but were uninfluenced by the suture, and reduction in calibre, of the sinus.

of venous formations, I am justified, at least, in hazarding the prophesy that the day is not in the distant future when the surgeon will resort to the same methods of treatment for wounds and diseases of the sinuses and arteries of the brain as govern him in like or similar lesions of the trunk and extremities.

CASE OF FRACTURE OF FEMUR COMPLICATED WITH SACRO-ILIAC DISLOCATION.

By F. J. GRONER, M.D.,

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SURGEON TO MERCY HOSPITAL.

W. H. KEARNEY, aet. 21 years, was injured April 13, 1884, being struck on the back and hip by a log, which rolled from a car which he was helping to load. Upon the following day, when admitted to the hospital, the parts were greatly swollen, and a fracture of the right femur, only, was recognized. There seemed to be undue prominence of the right hip, but no dislocation could be detected. For several days the patient vomited, and manifested symptoms of severe internal injury, but these symptoms subsided at the end of the first week. Great pain in the back was complained of, requiring large doses of morphia to relieve it. At the end of two and a half weeks, for the purpose of facilitating further examination, the fractured limb was enveloped in plaster, and the patient got up on crutches, though still complaining of great pain in the region of the sacrum. Now it was apparent that the sides of his pelvis were not symmetrical. The right hip was unduly prominent, and digital examination showed the right ilium to be separated from the sacrum to the extent of about one and a half inches. The tuberosity of the ischium was very prominent, and lower than that of the opposite side. No separation at the symphysis could be detected, nor any fracture of the pelvic bones. The pelvis was surrounded with a broad bandage, and, as any movement

was accompanied with pain, the patient was remanded to bed for about six weeks longer. He was then gotten up on crutches, though not without much urging. Adhesions, meanwhile, had formed at the hip-joint, so that when force was used to move the thigh, the entire innominate moved with it. About twelve weeks after the injury, the patient was etherized, and these adhesions about the hip-joint were forcibly broken up. No bad results followed, and two weeks later the proceeding was repeated. After this frequent passive movements were employed without an anæsthetic. About the end of the fourth month from the date of the original injury, he fell and re-fractured the femur. The motion in the hip-joint was better, however, after this accident, and his use of the limb was improved. Two months later, he again fell, and the third time fractured the femur. Good union, however, took place, and, at the date of the present report, nine months after the original accident, he is able to walk with a cane, and is doing work about the hospital. There is no more pain; the union between sacrum and ilium is firm; the tuberosity of the ischium remains prominent, and the line of separation can be plainly felt.

COAPTATION FORK FOR TREATING FRACTURES OF THE PATELLA.¹

By L. A. STIMSON, M.D.,

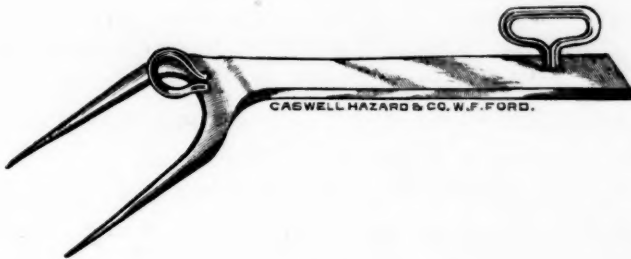
SURGEON TO THE PRESBYTERIAN AND BELLEVUE HOSPITALS, NEW YORK.

IN using Malgaigne's hooks, I have found it difficult to insert the hooks deeply enough to adjust the screw that connects them, and hence, have been led to devise some substitute. The result is this fork. (See figure.) It is of iron, two-pronged, the prongs bent on the flat at an angle of about 45° at their junction with the shaft. The prongs are one inch long, and $\frac{3}{4}$ inch apart; the shaft is about 3 inches long. There is a small ring at the base of the prongs, for the attachment of an India rubber cord, and another, at the end of the shaft for the attachment of a bandage encircling the thigh.

¹ Presented to the New York Surgical Society, December 9, 1884.

The instrument is used by inserting the prongs through the skin above the patella and pressing them down until they rest against the upper border of the upper fragment; the shaft lies along the median line of the front of the thigh, and is prevented from tilting or moving to either side by a roller bandage wrapped around it and the thigh. Traction downward is made by a piece of India rubber tubing, one end of which is attached to the ring at the base of the prongs, and the other made fast to the front of the shin by adhesive plaster. The introduction of the prongs can be made easily and painlessly by chilling the skin with ice and making two punctures with a knife.

In the case which I have treated with this fork, the fracture was transverse, and the separation about one inch. The separation was



readily overcome by the traction, and the patient made no complaint during the five weeks the instrument was in place. The patient was kept in bed with the limb suspended in a wire gutter and the punctures kept dusted with iodoform; there was no inflammatory reaction about them, and only a slight discharge. The lower fragment was kept gently pressed forward by an oblique turn of a rubber bandage.

On the removal of the fork, five weeks after the occurrence of the fracture, the fragments were closely and firmly united, without independent mobility. As a precaution, a plaster bandage was then applied, and not removed until the end of the ninth week. The knee could then be flexed nearly to a right angle, and there was neither independent mobility nor separation of the fragments.

EDITORIAL ARTICLES.

TUBERCULOUS SURGICAL AFFECTIONS.

(Continued.)¹

THE CONDITIONS WHICH PREDISPOSE BONE TO TUBERCULOSIS.²

We regard this paper of Prof. Charpy, which it is our intention to review this month, as deserving much more attention than it seems to have received, and, for this reason, shall summarize its contents at some length.

For a long time, those who make a business of preparing anatomical specimens have been accustomed to divide bones into three classes, as follows:

Red bones; more vascular.

Yellow bones; more fatty, both to the eye and the finger.

White bones; more dry, eburnated, less vascular, found especially in consumptives.

This classification is a practical one, though difficult to justify in theory. Sometimes a given specimen will scarcely belong in either class; while, too, there are certain fine distinctions, since all red or white bones are destined to become yellow during the old age of the individual; and, again, in anæmic, albuminuric, or other patients, all these distinctions may be lost. Nevertheless, for present purposes, the classification may be allowed to stand.

I. RED OR VASCULAR BONES. These are, in most cases, and to all intents and purposes, young or foetal bones; the latter containing a deep tinted marrow, to be sure, but, whether wet or dry, it becomes

¹ See page 233.

² *Des Conditions favorables ou défavorables à la tuberculose osseuse.* Par M. Charpy. (*Revue de Chirurgie*, Sept., 1884, p. 689.)

lighter, since it is not deeply impregnated with either fat or blood. Whilst red bone, when fresh, "sweats" blood, as the others do greasy matter, the same bone when dry turns to a dark color. These red bones, of powerful construction, with strongly marked surfaces, and well supplied with vascular canals, are but slightly predisposed to tubercle. Richly vascular organs, as a rule, do not accommodate themselves to tubercle, any more than those which are slightly so. Thus, in the lungs, the apices, which are usually first affected, are less richly supplied with blood than the bases. It is well known that the chronic congestive and catarrhal bronchites, which would seem to afford a propitious lodging-place for microbes, rarely lead to phthisis. Rindfleisch is by no means the only one who believes that in order to cure tubercle it is only necessary to create a hyperæmia.

This apparent aversion of tubercle for blood is, perhaps, in reality, an aversion for oxygen. Numerous facts and observations give plausibility to the view that the infectious element is an anaerobic organism, preferring a restricted atmosphere. In all the centuries that have elapsed since curative remedies have been sought, nothing has been found better than pure air.

The practice of M. Ollier, whose opportunities are so vast, is based on this principle; in every lesion suspected to be tuberculous, caries, white swelling, fungosities, etc., the general plan of procedure has been the same — *i. e.*, extensive opening of the *dépôt*, exposure of the diseased surface, stimulating irrigations. It is on this account that this surgeon rejects all partial resections in cases of tumor albus, not desiring to leave behind any focus of disease or infectious fluids. It is for this reason, also, that he opposes rapid, complete union, but leaves numerous drainage openings with drains of large size, allowing the latter to remain a long time.

And so, in summing up the values of the complex elements entering into this therapeutic procedure of resecting and operating according to Ollier's methods, the necessity for revealing and unearthing the numerous foci of disease, the indifference of drugs, the necessity of drainage, the rapid improvement which country air permits, the recedes when drainage is interfered with — one is justified in asking if the entire therapeutics in these cases cannot be included in one term — *aeration*.

But to return to red bones. There passes through them too much blood — that is, too much oxygen — to allow tuberculosis to develop to advantage. Virtually the same influences are felt in different parts of the skeleton. The frequency of lesions in the hand and feet may be due to their distance from the circulatory centers. So it happens in each bone in children; tuberculous lesions are most frequent in least vascular parts — *i. e.*, about the epiphyseal junctions. When at such junctions lesions do occur, it is at a time when the osteogenetic process is drawing to a close. Thus, in the excellent thesis of Goullioud (Lyon, 1883), it appears that about the pelvis post-pubertic marginal tuberculous ostitis appears to become more frequent in advancing from the twentieth to the fortieth year; the epiphyseal margins, which appear at the fifteenth or sixteenth year, having united by the twentieth; by the twenty-fifth year the union is solid, and circulatory activity, previously provoked, is on the decline.

II. YELLOW OR FATTY BONES. All marrow begins as red marrow, with one or two per cent. of fat, and ends by becoming yellow, with sixty to seventy per cent. of fat; and whether this change shall take place slowly or rapidly depends on diverse conditions, especially on that which is known as fatty necrobiosis or degeneration — adiposity. This condition is not perfectly established until the time when the full growth of the individual has been reached — say the thirtieth year, or thereabouts. But this tendency to adiposity is known to lessen in proportion, according to growth, as puberty is increased. In adolescents, we see the marrow of the large, hollow bones turning orange or brownish color, while in the hands and feet, or in the scarcely united epiphyses (trochanters) it is manifestly fatty. These variations undoubtedly bear a relation to the somewhat sluggish character of the blood-current through the bones. Indeed, Bourguery has said that bone is simply a large, cavernous arrangement, where stagnation of the blood-current favors the deposition of fat.

The rule which regulates this change is, that adiposity progresses from the periphery to the center, gradually approaching the region of large vessels and the heart. Thus, the hands and feet undergo the change before the forearms and legs, and the latter before the thighs and arms; the bones of the trunk (pelvis, ribs, vertebræ), receiving

their blood in a more direct way, remain "red bones" much longer than the others; and the individual whose sternum has become a really "yellow bone" must have reached a ripe old age. So, in a given long bone, its distal extremity will become fatty before its center, and the epiphysis before the neighboring diaphysis. One sees the greasy epiphyseal spot diffuse, as it were, across the lamellar partitions of the old cartilaginous junction, and extend as a layer into the bordering bony territory going toward the fat already in the medullary cavity. Those juxta-epiphyseal regions, which are nourished by large vessels (the latter often as large even as the principal nutrient artery), resist the change much longer — often until advanced life is reached.

This fatty change is slow or rapid, according to individual peculiarities, just as is the formation of points of ossification, or the union of epiphyses. Thus, the femoral neck will sometimes be fatty and friable at the fortieth year (an anticipated local senility), or firm, rigid and still "red" at the eightieth.¹ Fatty infiltrations are variable also in color and consistence. The former is certainly due to the amount of contained blood, so that even a streaked appearance may be sometimes noted. Temporary appearances of this nature may be, moreover, caused by the artificial anæmia caused by the Esmarch bandage; it would be of interest could we know how many times, under these circumstances, in fatty and softened bone, has the pale appearance owing to arrested circulation been ascribed to a purulent infiltration.

This fatty transformation takes place by degrees, and by numerous points of attack at the arterial terminations; while, owing to these conditions, peculiar color appearances and effects are sometimes produced. One, therefore, in describing morbid changes, should be very careful about speaking of congestion, infiltration, etc.; and it should be remembered that exposure to air of a fresh section will very materially affect the tint.

The fatty condition above described must not be confounded with rarefying processes in bone, which are also the effect of age. The two,

¹ The temptation is a strong one to devote a little space here to the consideration of the bearing of these facts on the general subject of fractures of bones, especially of the femoral neck; but we feel that we must simply follow our author, at least in this place.

though often associated, are not necessarily parallel. Fatty adult bone is not rarefied; all its lamellæ and trabeculæ are preserved; it is firm and solid; its tenacity may even be augmented. On the other hand, senile bone is distinguished by an entirely different feature, namely, atrophy. Its original volume may or may not be preserved, but its trabeculæ have thinned or disappeared; its lacunæ now resemble geods, as Cruveilhier remarked; its diaphysis becomes more like a mere shell; it is more frangible. The combination of these two conditions constitutes what some authors have called *osteoporosis adiposa*. That these are not two manifestations of the same cause is proved by the fact that in old persons the sternum and ribs are rarefied and fragile while their marrow substance is yet red. That which goes by the name of *senile osteomalacia* seems to be, in effect, this same condition of affairs; for the marrow of the trunkal skeleton is brownish, not yet yellow, incompletely fatty, and the bones have undergone more or less rarefying atrophy.

So with bone in immobilized limbs; its condition is similar; it passes into two conditions of adiposity and rarefaction; it is, to all intents and purposes, senile bone, but it has aged rapidly; its weeks have been its years. "From the moment of its immobilization it has begun to atrophy and rarefy; its spaces to enlarge by absorption of lamellæ, and its osseous tissue to be replaced by fat." (Cruveilhier.)

On studying this deposition of fat it is found to be due to a diminished nutrition. The fatty bone preserves its investments intact, but within these its Haversian canals, its medullary canal, and its finer spaces fill up with vesicles of fatty material, and its blood vessels are proportionally diminished in size; a process which may be unduly hastened by alcoholism, obesity, and by immobilization from any cause whatever. One is therefore forced to conclude that the whole process indicates a diminished vitality; but only diminished, not destroyed, for it is equally plain that fractures of bone thus affected heal well and consolidate perfectly. So, too, of the fatty surroundings often noted about a tuberculous focus. Ollier has found that after *évidement* or resection they take a proper share in the reparative process.

And now, is fatty (yellow) bone a favorable site for the development of tuberculous processes? On this matter exact statistics are needed

before it can be fully and exactly stated. Nevertheless, as "red" bone seems too highly vascular soil for tubercles to grow on, so "yellow" bone seems on the other hand too slightly vascular, and consequently does not afford a soil any better conditioned.

This statement is borne out by the following facts: In young subjects it is not rare to see tuberculosis arise in the center of an epiphysis, and but slowly invade the articulation. This is not the case in adults; among grown-up individuals it is more often the tendinous or articular synovialis which is first attacked, and the fatty epiphysis is slow to succumb, so that often only a thin layer has to be removed in resecting. This is true, also, of smaller joints; in the carpus or tarsus the tubercular process diffuses more across and along the synovial membranes than by way of the bone—in adults.

Apropos to this indifference of yellow bone to tubercle, we take the following from Nélaton's work (1848): "The spongy tissue of bone, in adults, presents two very different varieties, which may be designated as 'adipose' and 'vascular,' or 'red.' The extremities of long bones and the short bones of the extremities are constituted of the first, while the bones of the trunk are composed of the second. It is in this secondary variety of bony tissue, in adults, that tubercular products almost exclusively develope. In young children these differences do not exist to any marked extent, the bones of the limbs, like those of the trunk, being formed of the red variety, and tuberculosis attacks either indiscriminately. But in the adult it most often is noted in the trunk. To this law there are few exceptions, and the explanation of these is found in a tardy transformation of one variety into the other."

III. WHITE OR CONSUMPTIVE BONE.—White bone is, *par excellence*, favorable to tuberculosis. The skeletons of phthisical subjects have always been the favorite with those who make a business of preparing them, on account of their whiteness and fineness of grain, and their minimum content of blood and fat. They have comparatively small vessels, and are of the atrophic type, albeit not the rarefying atrophy of old age with preservation of external volume, but meaning thereby, that they are reduced in size and volume, having the characteristic markings less developed; they are the bones of youth even in

adult age; the Haversian canals are narrow, and the osteoblasts are small.

Take for example a humerus of the same length; it would weigh,

In a very muscular subject, - - - 240 grammes.

In a moderately " - - - 218 "

In a consumptive " - - - 167 "

But take an exactly equal *volume* of bone from each and the phthisical (white) bone will astonish by its weight; it is more dense, it is *all* bone, compact, even ivory-like. Those who have opened many phthisical chests in making autopsies know with what difficulty the ribs are cut.

Is this then a distinctive or special type of atrophy,—and if so, just where shall it be placed? Ollier has described a form of growth of bone which he calls *atrophic elongation*; and his student, Mondan, in a remarkable thesis on *Atrophies* (Lyon, 1883), has completely studied it. Let us suppose an adolescent subject with a lesion of his femur which arrests its proper development by stiffening his limb (—disuse); it now happens that the tibia of the same side instead of growing less, rapidly grows faster, as if in compensation; it becomes longer, but more slender. Ollier explains this as a functional inertia, or, more strictly, as a growth from lack of due pressure from weight of the body. The osteoplastic process goes on with less restraint from pressure than in the other leg. Thus are explained those rapid growths which are noticed in acute cases where patients are confined to bed.

This matter of atrophic elongation has been disputed, but Ollier has placed it beyond doubt, by both clinical and experimental studies.

This peculiarity gains a certain importance, also, from a speculative point of view, *i. e.*, the laws of growth and development. The total growth of an organism is composed of growth in a vertical direction (length), and growth transversely (breadth, thickness), and these have not exactly the same origin; the former is mostly cartilaginous, the latter periosteal. These do not necessarily harmonize with each other toward the perfect type. Thus, growth in infancy is mostly transverse; in adolescence it is vertical even to excess, and finally returns to the infantile type. But in the adult it is not rare to see that one or the other seems to have predominated. Taking now the incontestably

vertical type, the adolescent, and regarding the slender bones developed in length at the expense of thickness, *we must ascribe this method of increase to atrophic elongation.*

So in the case of the phthisical subject, or him with the scrofulous diathesis; the neck, the long sides, and hands, the chest reduced in its transverse diameters, the sharp xiphoidean angle, the small waist, flabby muscles, insufficient for prolonged effort, and the constricted size of the arteries, nourishing all these parts—all these show the atrophic lengthening.

These physical signs permit only the following interpretation: We may regard bone as a definite quantity in the life of the individual, and, if we wish to carry this idea even farther, the blood as the dispenser of subsistence. According to the manner in which the blood is allowed to perform this function, will the system be well or ill-proportioned as between extremes of these two types. Hereditary influences aside, the youth becomes tall, because his transverse growth is feeble, and this is feeble because periosteal activity is in accord with muscular activity. But youth on whom is imposed more muscular exercise become large and strong, with muscles thicker than they otherwise would be, though this is at the expense of their vertical growth. At the time when the youth becomes an adult, cartilaginous growth slackens, and periosteal growth assumes the lead, stimulated thereto partially by muscular activity, and the bone is more thoroughly vascularized. The muscular *in*activity of tall patients, and those of phthisical habit, cannot do otherwise than relax periosteal activity. The same holds good with regard to the growth of stumps and immobilized limbs.

Hence, it may happen that mere pressure, or lack of pressure, do not exercise so great an influence as has been ascribed to them by Ollier.

And now having a definite idea of this atrophic type of growth of bone, we may once more ask: Is such atrophic bone favorable for the deposition of tubercle? And the answer is: The microbe of tubercle is there perfectly at home, not no much as a parasite, but as a proprietor of the soil. It is on ground which generations of its predecessors (in the patient's ancestors) have prepared for it, either directly or by circulatory inactivity, and handed down by heredity.

It is poor soil, badly fertilized, insufficiently irrigated and drained, but is *home* for the bacillus tuberculosis. Most tuberculosis of bone occurs in such locality as has been just described; it is here that it locates itself so easily, so tenaciously, so persistently; and it is in such cases that the danger of generalized infection hangs over the patient's life as a constant menace. The whole bony skeleton is in an equally favorable condition of receptivity; the accidents of exhaustion, cold, trauma, articular or tendinous fatigue, circulatory disturbance during growth, etc., determine the exact spot where outbreak shall occur.

In spite of the gravity of these bony lesions, which we may paradoxically term tuberculosis of the tuberculous, they are fortunately not entirely beyond our resources. If the prognosis for the physician is always grave, it is a consolation which the surgeon should duly appreciate and that he alone possesses, that he is very often able to seek out this hidden enemy, contest with him his chosen ground, and conquer him there.

ROSWELL PARK.

INDEX OF SURGICAL PROGRESS.

Wounds, Injuries, Accidents.

I. CORROSIVE SUBLIMATE AS A SURGICAL DRESSING. By Sir JOSEPH LISTER, Bart., F.R.S. Corrosive sublimate is not decomposed by albumen, but may become chemically associated with it, remaining in solution and not losing its antiseptic properties. The compound, whatever its precise nature, is soluble in excess of serum, and is less irritating in its action than pure sublimate; it is insoluble in water. Gauze is therefore impregnated with sublimate and serum (from horse's blood) 1-75, two and a half parts of liquid to one part of gauze. 1-100 serosubliminate gauze is better than the best eucalyptus gauze. Blood is more albuminous than serum, therefore a bloody discharge requires a more powerfully antiseptic gauze than does serum. Sublimate gauze absorbs better than carbolic gauze, because the latter contains paraffin. Use sixteen layers at first where there is likely to be much discharge. Rags, charpie, or any cheap fibre may be impregnated. 1-50 gauze sometimes irritates; 1-100 seems quite reliable.—*Lancet*. 1884. Oct. 25.

A. F. STREET (Westgate).

II. TOXIC ENTERITIS CAUSED BY CORROSIVE SUBLIMATE AS A SURGICAL APPLICATION. By DR. GEORGE L. PEABODY (New York). The records of the New York Hospital during eighteen months reveal eleven cases in which the use of corrosive sublimate as an antiseptic dressing or application was followed by obstinate diarrhoea, which did not yield to the usual remedies, and which sometimes ceased on the drug being discontinued, but which, in seven instances, was followed by frequent bloody discharges, griping, tenesmus, prostration and death. In three of these seven cases autopsies were made, and in each of them a very extensive diphtheritic inflammation of the large intestine was found. The author refers also to records of similar cases by Fränkel, Schede and Thorn. Salivation is very exceptional in these cases of poisoning. He emphasizes the fact that, so far as he has been able to learn, death has not resulted from its use in surgical dressings, such as bandages, etc., but only after irrigation of abscess cavities, uteri, vaginae, large wounded surfaces, the peritoneum, etc., etc.—*The Medical Record*. 1885. March 14.

III. HOT WATER IN THE TREATMENT OF OPEN WOUNDS. By T. R. VARICK, M.D. (Jersey City). The author advocates that upon wound surfaces water, of a temperature slightly below boiling point, be poured freely and continuously, immediately after the larger vessels have been tied, until all oozing is stopped, the parts

are thoroughly glazed, and the red tint of the tissues is slightly deadened. The effect of this practice is to form a protective shield of coagulated albumen, to mitigate shock, and to accelerate healing in a marked degree. Since its adoption the author has had no death from either primary or secondary shock, nor has he had a single case of septicæmia.—*New York Medical Journal*. 1885. Feb. 28.

IV. THE AUSCULTATORY SYMPTOMS OF WOUNDED BLOOD-VESSELS AND SO-CALLED TRAUMATIC ANEURISMS. By Prof. EDWARD VON WAHL (Dorpat). Clinical observation, shows that a wounded artery per se produces acoustic symptoms, quite independently of the question whether an aneurism is present or not. The author points out that after a partial division of the wall of the vessel the latter has, in point of fact, become wider, and therefore all the necessary conditions for producing sounds are given.

To prove this, Carl Blau, one of the author's students, performed some experiments with elastic tubing and upon animals. Water, under a pressure equal to a column of water 1485 mm. high, or of 110 mm. of mercury, was forced through tubes of 6 mm. in diameter, the ends of which were immersed in water to prevent additional sounds being produced by the current issuing from the end of the tube, and, after repeating Corrigan's experiments, it was found that on excising a piece 3 mm. long and 2 wide a loud continuous sound was audible, both if the current was continuous or interrupted with the help of valves and a bulb, while diminishing the thickness of a part of the wall of the tubes caused a bulging of the tube synchronous to the impulse, and a distinct bellows murmur.

The experiments upon animals were conducted by first dissecting out an artery (in horses the facial or carotid; in dogs the femoral artery being mostly chosen; sheep, calves and cats being also taken) and temporarily ligaturing them doubly; after uniting the skin again with a series of exact sutures, the artery was laterally incised with the knife or scissors—a tense hæmatoma resulting. Auscultation revealed a systolic souffle in each case, except when the artery was thrombosed; in complete division of the artery no murmur was audible; when the current was interrupted the murmur was likewise, whether the hæmatoma presented pulsations or not.

The second part of the memoir is given to clinical records of cases, collected from various sources, twenty-one of which are given with more or less attention to detail. The author then proceeds to criticise the symptoms generally given for wounding of arteries in the various systems of surgery; firstly, hæmorrhage through the wound, as being of little practical value, since hæmorrhage very soon ceases, and it is not till the fourth or fifth day that secondary hæmorrhage is to be feared; secondly, infiltration of the tissues with blood—the primary peri-arterial hæmatoma of Klebs—possessing only a relative diagnostic importance, since it can only occur under special circumstances and in certain arteries (*a.* subclavia, axillaris, brachialis, femoralis iliaca externa, and glutæa); thirdly, the absence of the pulse below the injury, as liable to be caused as well by thrombosis or compression without any injury to the artery; finally, general symptoms, fainting vomiting, thirst, aphonia.

After insisting upon the importance of always auscultating with the help of the stethoscope and repeatedly, in fresh cases, the author finally thus represents his views:

(1.) In every partial division of an artery, as long as blood flows in a groove formed by half of the artery, a blowing or grating murmur, intermittent and synchronous with the pulse can be heard, and most distinctly at the place of injury.

(2.) In favorable parts of the body peri-articular hæmatoma rapidly appear, presenting murmurs synchronous to the pulse.

(3.) In complete interruption of the current no murmur is heard, but the pulse is absent, owing to retraction of the ends of the artery in the wound or to thrombosis.

(4.) In case the central or peripheral end of a divided artery again opens, rapidly increasing pulsating hæmatoma not infrequently appears, presenting no sound, unless the concomitant vein be simultaneously injured.

The treatment should consist in at once laying open the wound, as soon as the diagnosis is made, even if the wound does not bleed, and ligaturing both ends of the artery, as everything is favorable for such a proceeding. By this means secondary hæmorrhages can be prevented and the mortality percentage of sixty to eighty per cent. existing at present diminished.—*Deutsch Zeitsch f. Chirurg.* 1884. Sept. 24.

W. VAN ARSDALE (New York).

V. AUSCULTATORY PHENOMENA IN VASCULAR INJURIES AND SO-CALLED TRAUMATIC ANEURISMS. By Dr. E. V. DÜHRING (Erlangen). In this article the author combats the conclusions of V. Wahl, as given above. In a case where the right axillary artery was completely torn across, as evidenced by the clinical history and proven at the amputation, a systolic murmur isochronous with the left radial pulse was clearly and repeatedly made out over the point of rupture and swelling. He further experimented on four large dogs. Dühring does not believe that the vessel retraction is generally so great as to cause rapid obturation. He concludes:

1. That the formation of coagula soon puts a stop to pulsation (in the swelling), since the soft clots form a bad conduit.

2. That the murmur may rapidly vanish, especially where previous ligation has perhaps injured the intima and thus favored thrombosis.

3. That the lumen frequently remains open, and that in these cases, as well in fresh hæmatoma as in traumatic aneurisms, a buzzing murmur isochronous with the pulse is to be heard, this is accompanied with pulsation in case of aneurism, but not necessarily in hæmatoma.—*Centbl. f. Chirg.* 1885. March 7.

W. BROWNING (Brooklyn).

VI. RUPTURE OF THE GLUTEAL ARTERY—HÆMORRHAGE CONTROLLED BY DAVY'S LEVER. By M. HAWARD (St. George's Hospital, London). A man, aged 24, was struck on the right buttock by the buffer of a locomotive. A wound with great extravasation of blood resulted. As the hæmorrhage could not be stopped, Davy's lever was applied to the iliac artery, and the wound was enlarged. The

gluteal muscles were found to be torn across, and the gluteal artery was discovered ruptured at the sciatic notch. It was tied, and the patient recovered.—*Lancet*. 1885. Jan. 3.

VII. RUPTURE OF THE AXILLARY ARTERY—LIGATURE—RECOVERY. By Mr. LANGLEY BROWNE. A boy, aged 14, fell into a hole, and was struck in the left axilla by an iron bar, with which his extended arm came in contact. There was much collapse; no pulsation in the brachial or radial arteries. A swelling, the size of an orange, was found over the upper part of the brachial artery. The skin was bruised at this part. There was no pulsation in the tumor. An incision was made through the swelling, but as the brachial was uninjured, the wound was extended into the axilla. A quantity of blood clot was scooped out, and a rent was found in the posterior part of the artery, not across it, but in its own axis, about half an inch in length. A blood clot protruded through the slit. A ligature was applied above and below the rent, and the patient was discharged well in three weeks. Mr. Browne observes that it is curious that the artery should have ruptured in its own length, and that the injury was not beneath the external bruise.—*British Medical Journal*. 1884. Nov. 15.

WILLIAM THOMSON (Dublin).

VIII. ON THE RUPTURE OF VEINS, WITH THE REPORT OF A CASE IN WHICH THE RUPTURE OF A DEEP FEMORAL VEIN WAS SUCCESSFULLY TREATED BY LIGATION OF THE RUPTURED VESSEL. By HENRY B. SANDS, M.D. Excepting rupture of varicose superficial veins, this accident is rare, and its literature scanty. Rarely fatal, its pathology is obscure. Its causes are often trivial, and its consequences may be disastrous. The case related shows that danger to life may be occasionally averted by operative interference. Preceding the report is a resumé of the examples of this lesion recorded by the older pathologists. Morgagni found a rupture of the azygos vein; Portal, of the superior vena cava; Helwin, a similar case, the rupture taking place into the pericardium; Andral, of the inferior vena cava during a violent struggle. Rupture of the internal iliac vein has occurred spontaneously. Hey, of Leeds, saw a child in whom, after a fit of screaming, a hæmatoma appeared over the external jugular vein. The cases of greatest surgical interest are those in which the ruptured vein is situated in one of the extremities. In such cases trauma is the most frequent cause. Rupture of the axillary vein in attempting to reduce an old dislocation of the humerus is a familiar instance. Simple fractures, accompanied with hæmorrhagic extravasations, have occurred, due in all probability to rupture of a large vein. Death not following, the lesion of the vessel is generally repaired and the extravasated blood absorbed.

Rarely the vein remains open, and a blood-cyst is formed, which, in a case reported, continued over two years. The violence causing the rupture is often slight. Wise relates the case of an adult who sustained, as it was thought, a rupture of the internal saphenous vein, near its junction with the popliteal, from a slight fall while walking. Violent muscular contraction will cause the lesion. Hodgson reports two cases in which a severe cramp of the gastrocnemius muscle caused rupture of a vein in the

leg. Else relates a case in which a man of twenty-five was seized with pain in the leg while lifting a heavy weight. A hæmatoma followed, was opened, mistaken for aneurism, and the limb amputated. Dissection revealed a large ruptured vein. Deep-seated hæmatomata occur from rupture of varices, which Verneuil proved to exist in and between the muscles of the lower extremities, as well as superficially. The author reports a case in which, the subject being a male, aged 51 years, a rupture of a deep femoral vein occurred spontaneously while he was walking along a street, April 9, 1883. Sharp pain at the time, and subsequently increasing swelling and ecchymosis of upper and anterior part of thigh. No pulsation or thrill, varying tension, not diminished by compression. June 29, 1883, the parts were incised, and at the bottom of a cavity filled with blood clot and fresh-fluid blood, at a point near the middle of the femur, a lateral opening in a vein of considerable size was detected. The vein was apparently one of the *venæ comites* of profunda artery. Mediate ligation above and below the wound was done. Cavity stuffed with iodoform gauze. Rubber drainage tube passed through counter opening opposite great trochanter. The progress of the case to recovery was uneventful. Sands comments that absence of cardiac disease, external violence or unusual muscular exertion warrants the suspicion that the coats of the vessel were abnormally weak at seat of rupture, corroborated by the varicosity of superficial veins. The case proves that rupture of a vein may produce a condition analogous to a false aneurism. A vein will usually collapse when wounded, but if the opening be large, and surrounded by unyielding tissues, the hæmorrhage may continue and form a cystic tumor. Two points of contrast between such a tumor and an ordinary hæmatoma: In the latter, the swelling reaches its maximum at an early period, and no increase in size will take place, except that due to suppuration. The second point is, in the former, a sudden, decided increase in bulk, tenseness and elasticity. This can be due only to fresh extravasation, and should be carefully watched for. The analogy extends to principles of treatment, viz., lay open the blood cavity and tie the vessel above and below.—*Archives of Medicine*. 1884. December. G. R. BUTLER (Brooklyn).

IX. GUNSHOT WOUND OF THE INTESTINES—LAPAROTOMY—SUTURE OF THE INTESTINES—RECOVERY. By W. T. BULL, M.D. (New York). A male, aged 22 years, was accidentally shot with a pistol of caliber 32, the ball entering the abdominal wall near the navel. Seventeen hours after the accident, the pulse being 102, respirations 30 and temperature 100.2° F., and the abdomen being slightly tender to the touch all over, laparotomy was done by Dr. W. T. Bull with minute antiseptic precautions. The usual incision was then made in the middle line, from the umbilicus to just above the pubes. On opening the peritonæum, bloody serum, without any fecal masses, but containing small clots, flowed out freely (at least two pints), floating the coils of intestine into the wound. On the free border of the first portion of gut presenting was a slight incised wound of the serous coat only, which was doubtless made by the scissors. It was tied with catgut over an artery clamp. Several coils of intestine, representing three or four feet in length, were then pulled out of the

wound and carefully examined. The intestine and mesentery were coated here and there with clots and flakes of fibrin, and these were so adherent that, to dislodge them and see the surface clearly, it was necessary to rub the peritonæum firmly with the sponge two or three times, and this both on its upper and lower surface. The gut was lightly congested, and its coils were not adherent. These were placed under layers of towels, and occasionally drenched with warm water. The first wound was about half an inch in diameter, situated midway between the attached and the free border of the intestine, and several feet from the cæcum. The serous coat was clean-cut, the mucous membrane lacerated and everted. It bled easily when its edges were separated, but not till then did yellow fæces, of the consistence of gruel, escape. (The same was true of all the wounds. The everted mucous membrane acted as a plug.) The abdominal wound was then plugged with large sponges to shut off the cavity, leaving only space enough for the protrusion of the loop of six inches, which contained the wound. This was spread out on a towel, emptied of fecal matter through the bullet wound, and held with both hands by an assistant. The mucous membrane was inverted by making traction with two hooks, so as to convert the round hole into a longitudinal slit, parallel with the transverse diameter of the gut. The peritoneal edges were then approximated by five sutures inserted according to Lembert's method. Iodoform was rubbed along the line of suture. (This plan was followed with all the other wounds.) After removing several more loops the cavity of the pelvis was empty, and the cæcum, the sigmoid flexure, the rectum, and the bladder were inspected after sponging out considerable bloody fluid, with clots. The bullet was detected at once, lodged in the upper surface of the sigmoid flexure, close to its mesenteric border. It was just beneath the peritonæum, but, on removing it, the wound was found to enter the lumen of the bowel, which was quite empty. Three sutures closed the wound. The open pelvis was then protected with sponges, and more intestine drawn out from under the left edge of the abdominal wound. A third perforation was encountered, similar to the first in size, but situated on the upper surface of the gut, near its free border. A fourth and fifth were also found close together, and separated only by a ridge of the serous coat, nearly opposite the preceding one, but an inch higher up, and a sixth one about three inches farther on. These four wounds were all within a length of four inches of the intestine. The two which were so close together had ragged and everted edges, from which the serous coat was stripped off for a distance of one-eighth of an inch. The bowels contained fæces and were treated as before described. But the fourth and fifth wounds were converted into one oval slit by trimming off the ragged edges, and twelve sutures were required to close this, while five each were put into the other two wounds. The oval wound made by trimming the two adjacent ones embraced about one-third the calibre of the bowel, and its axis when sewed up was oblique in direction. The others were parallel with the transverse axis.

A few loops of intestine still remained in the cavity. In removing them the seventh perforation was found, several inches beyond the sixth. It was closed with five

sutures. The small intestine, except the duodenum, was now all out. A sponge on a holder was passed into the epigastric and both lumbar regions. No blood or foreign matter was detected. The great omentum was not seen.

The pelvis was again sponged out, this time with a $2\frac{1}{2}$ per cent. solution of carbolic acid, the intestines replaced, the lines of suture being inspected as they were encountered. The wound in the middle line was closed with heavy silk sutures, passing the entire thickness of its walls, and superficial cat-gut sutures. The incision in the bullet wound was sewed up in the same way, a drainage-tube being left at its lower end. Iodoform and borated cotton dressing.

The operation lasted two hours. Shock great, but was overcome by hypodermics of whisky and digitalis, and by a hot-air bath. After treatment: Cold-water coil to abdomen; opiates; nutritive enemata. Condition critical during first week; evacuation of bowels produced by enema of soap and water on fourth day. Highest temperature, 101.5° , on the fifth day; superficial abscess developed in the track of some of the sutures; superficial portion of operation wound gaped and healed slowly by granulation. From the eighth day the patient's convalescence was uninterrupted.—*New York Medical Journal*. 1885. Feb. 14.

Tumors.

SECONDARY CANCEROUS DEPOSITS ORIGINATING BY INOCULATION. By PROF. DR. P. KRASKE. Creditable cases of one person catching cancer from another do not exist, although a few cases are known which indicate that a kind of auto inoculation may occur, *i. e.*, that secondary deposits may develop by separation of tumor elements and their inoculation in parts of the affected person more or less removed from the primary seat. Virchow noticed this method of propagation in connection with ventricular cancer extending to the serosa; here a multiple eruption of cancer often appears on the peritoneum, not uniform all over it, but often at distant points, especially such as would catch material running down the smooth abdominal surfaces, *e. g.*, the region of the lateral vesical ligaments, the recto-vesical, recto-uterine, or utero-vesical excavation. Small, isolated tumors, secondary nodules, start up in these localities as though from seed that had been sown. Lücke has seen an ulcerated cancrroid on the edge of the tongue inoculate the buccal mucous membrane of the same side; at least there was an analogous tumor which began later and was separated from the primary neoplasm by the healthy tissue of the bottom of the oral cavity, gum and lower buccal fold. Kaufmann described a case of cancrroid on both the dorsum of the right hand and the right conjunctiva bulbi in a woman of 81 years. He assumed that the frequent rubbing of the eye with the back of the hand had inoculated the conjunctiva. In the same category belong the very interesting flat-celled epithelioma (plattenepitheliom) of the stomach in conjunction with the same form in parts above, cases to which Klebs has called attention by three striking illustrations. In one case of ulcerated epithelioma of the œsophagus he found two similar, large

nodules below the cardia. Again, at the autopsy of a man who had suffered canceroid destruction of the face, with perforation into the mouth, pharynx and antrum Highmori, he found a tumor 5 cm. in diameter on the larger ventricular curvature; it had the same structure as the primary growth above. In a third case there was, in addition to a large epithelioma of the dorsum of the tongue, 5 or 6 round, slightly elevated nodules on the larger curvature of the stomach; these showed the same structure as the original tumor. Klebs assumes that in his cases the secondary ventricular deposits arose by implantation of neoplastic elements from the primary tumors. Another recent case by Ebse presented secondary tumors in the lower pulmonary lobes after perforation of the trachea by an œsophagus carcinoma.

Kraske adds two observations which he thinks belong in the same class. His two cases related to cancer of the rectum high up. (a) Woman of 52 years. Three weeks after successful extirpation of the cancer he found two lentil-sized nodules in the remaining rectal mucous membrane directly above the sphincter. These must have existed at the time of the operation and have been separated from the upper tumor by at least 10 cm. of healthy tissue. The secondaries were excised, and showed exactly the same structure as the primary tumor, an ordinary columnar-celled cancer. No relapse had recurred five months later. (b) Woman of 43 years. Both primary and secondary were here removed at one sitting. The latter was 10 cm. below the former; was situated immediately above the anus opposite the columnæ Morgagni, where the rectum is covered with layers of pavement epithelium, and yet it had identically the same structure as the upper tumor, a columnar-celled carcinoma. Therefore in this case the smaller tumor was surely secondary.

K. admits that none of these cases furnish a direct proof of inoculation, though strong evidence. Ordinary metastatic origin, through the lymphatics and general circulation, *i. e.*, emboli, is possible, though very improbable. Such an explanation would be very forced, since no other secondary tumors developed. There is also no reason to consider them parallel to the peculiar eruption of nodules about mammary cancer. He points out that the conditions for development here are as favorable as in embolic metastasis. One reason why such inoculation does not more often occur is the necrotic condition of most material cast off from the surface of such growths.

Kraske's observations have a certain practical interest. Kraske found that in operated cases of high rectal cancer, where the lower, apparently healthy, mucous membrane was spared, it was frequently the seat of relapse. He concludes in harmony with accepted teaching that it is advisable to extirpate the rectum *in toto*, the external sphincter if possible excluded.—*Centbl. f. Chirg.* 1884. No. 48.

WM. BROWNING (Brooklyn).

II. CANCER OF THE TESTICLE IN INFANTS. By DR. MONOD (Paris). The author, after describing a case of cancer of the testicle in a child, aged 4, gives an analysis of twenty-seven cases of cancer and sarcoma of the testicle in children. In more than half the cases it is in the first year that the disease originates; after the fourth year cancer is exceptional.

The influence of heredity upon the production of the disease appears to be null, that of traumatism is open to discussion, and may, at any rate, act as a determining cause.

The clinical details of the cases are always the same. An apparently healthy child has an indolent, progressively-enlarging tumor of the scrotum. The tumor is usually noticed in the earlier months of life, sometimes even at birth; it occupies the testicle, is unilateral, smooth, ovoid, resisting with a sense of fluctuation, and heavy.

The spermatic cord is always healthy, and usually the lumbar and inguinal glands.

Hæmatocele may be thought of, but a puncture reveals the nature of this case.

The growth of the tumor is rapid.

The results of castration are not encouraging; the operation, when the case could be followed, having always been succeeded by generalization of the new growth, most often in the lymphatics, and sometimes in the lungs as well, death taking place within the year.

Histological examinations, though too rare for safe inference, seem to show that the disease is more often sarcoma than cancer.—*Revue des Sci. Med.* 1884. Oct 15.

III.—CYSTIC TUMOR OF THE POPLITEAL SPACE. By M. VERNEUIL. A healthy man had noticed, for some months only, a small, slow-growing tumor in the ham. The tumor was soft and fluctuating; occupied the centre of the popliteal space; approached the skin above, but was connected with the deeper structures in which it, apparently, originated.

Synovial sacs (follicules synoviaux) may be found by careful dissection in the region of the carpus and of the articulation of the knee. Two or three little synovial sacs are found very frequently on the internal surface of the posterior ligament of the knee; these sacs at times are the seat of cysts, of more or less considerable volume, which are usually irreducible. Sometimes they communicate with the knee-joint, and are then often reducible, but not invariably. In conclusion, the author believed that the cyst in the case related originated in a sac or prolongation of the synovial membrane of the knee-joint, and he intended to remove it.—*Gaz. des Hôp.* 1884. Nov. 18.
F. S. EVE (London).

IV. DIFFUSE ANEURISM OF EXTERNAL ILIAC ARTERY—LIGATURE OF PRIMITIVE ILIAC—PYÆMIA—DEATH. By J. W. S. GOULEY, M.D. (New York). The aneurismal tumor was in the right inguinal region, was of traumatic origin, and by rupture of the sac had become diffused. The operator proposed to ligate the primitive iliac, and then incise the sac, and turn out its contents and cleanse. He was overruled by his colleagues as to the proposed interference with the sac, and contented himself with ligating the primitive iliac. This was accomplished without disaster, but sloughing of the coverings of the sac and decomposition of its contents supervened, with rupture thereof on the ninth day. Pyæmic symptoms speedily developed, terminating in death on the twenty-first day after the operation. The reporter believes that if he

had carried out his original intention of freely opening the sac, the chances of recovery would have been greatly increased, and that this procedure, for which there is such strong warrant, and which is in itself so simple, so philosophical, and therefore so eminently surgical, should be more insisted upon than it has been of late years. The patient was in an excellent condition at the beginning to bear the proposed operation of incision of the sac. He succumbed from pyæmia solely because a great bag of dead and decomposing blood was retained in his flank.—*New York Medical Journal*. 1885. Feb. 28.

Bones, Joints, Orthopedic.

I. EXPERIMENTAL INQUIRIES INTO THE OSTEOGENETIC POWER OF THE MARROW OF BONES. By E. VINCENT (Lyons). The author describes a lengthy series of experiments on animals, from which he draws the conclusion that all the parts of a bone possess osteogenetic power, which is derived from a common cellular element, the osteoblasts. The largest share in new formation and regeneration of bone he assigns to the periosteum, the medulla being next, and the bony tissue itself last. This deduction he draws from the following premises:

1. Experiments in which after extirpation of medulla through a small opening at once occluded, the cavity became partially filled up with new bone.
2. Experiments in which a metal tube thrust through an opening in the epiphysis made through the cartilage of the joint surface, into the medulla, was found to be filled in its upper two-thirds with marrow, in the lower with new bone.
3. Experiments in which the shaft of the bone was completely denuded of periosteum. It necrosed, but new bone was found filling up medullary cavity, which he presumes to be formed from the medulla.
4. Experiments in which marrow obtained through an opening in bone was grafted among soft tissues, and found to produce some slight ossification. (Many failures in these experiments.)
5. The share of the bone tissue itself in regeneration, shown by the fact that when a portion of the epiphysis was destroyed through an opening in the cartilage, the cavity became filled with new bone.—*Rev. de Chirurg.* 1884. Nov.

H. H. TAYLOR (London).

II. EXSECTION OF BONES IN THEIR CONTINUITY PREPARATORY TO SECONDARY SUTURE OF TENDONS AND NERVES. By Dr. K. LÖBKER. Reference is first made to the now well established operation of nerve and tendon suture. It frequently happens, however, that the ends have retracted so far as to greatly interfere with or prevent success. The various methods of stretching the belly of the corresponding muscle, and of extreme flexion or extension of the part, may not overcome this. Hueter and Czerny have each cut a flap from the central end of the severed tendon—because this end would presumably be better nourished—and attached the flap to the

peripheral end. Gluck successfully replaced 3 cm. of tendon, exfoliated from the extensor indicis, by a strand of braided catgut.

When, however, whole groups of nerves and tendons are too short for suture, these methods no longer suffice. Such a case presented itself to Löbker last August. The patient had suffered, over five months previously, a cut on the volar side of the right forearm, some 3 cm. above the wrist. The wound had healed, but left a useless hand. This was much wasted; the interosseal spaces were sunken in, noticeable especially between thumb and index. The transverse cicatrix was 5 cm. long. The patient stated that there had been no sloughing of tissue. Having secured an excellent result in a previous similar case, L. concluded to extirpate the cicatrix and perform secondary suture. The first case was, however, operated only five weeks after injury, while this had existed 23½. The Mm. flexor carpi ulnaris and radialis, and the arteria radialis, were found intact; the other muscles, together with the median and ulnar nerves and ulnar artery had been severed. The central ends had retracted greatly and grown together. The peripheral ones were likewise imbedded in cicatricial tissue. After two hours' labor he succeeded in separating all the tendons and nerves and securing each stump with cat-gut. It was now found impossible to bring the corresponding ends together, even after extreme flexion at the wrist. It was finally decided, rather than give up the operation, to remove a portion of both ulna and radius; owing to the exhausted condition of the patient, the wound was put up in antiseptic dressing and left until the next day. He then removed 5 cm. of bone subperiosteally from the radius, beginning about 3 cm. above the radiocarpal joint, also the same length from the ulna. The bone ends were coaptated and united with silver wire. On slightly flexing the hand he succeeded in suturing the soft parts. Every nerve and tendon stump was cut off and the fresh ends united with catgut. Some of the more tensely stretched tendons were also tied with silk. Antisepsis, drainage. A couple of sutures to the external wound. Wire splint. Vertical suspension. No fever. First bandage changed on 22nd day, second on 31st, and third on 37th, when the wound had closed down to a few points of granulation, and the bulging of the soft parts had almost vanished. The occlusive bandage was left off after six weeks that electricity and massage might be applied. The bone ends had not yet united, and a splint was retained to keep them together. Motion soon began in the fingers. A month later, owing to the threatened formation of a pseudarthrosis, a water-glass bandage was applied. This still allowed active and passive motion of the fingers. The report ends two weeks later, *i. e.*, three months after the operation. Bandage removed. Consolidation of bones making good progress. Active motion of fingers to a right angle. Active adduction and flexion of thumb to some extent. Interosseal spaces again plump except the first. Sensation returning, though still greatly diminished. Bandage replaced and treatment continued. L. points out that in such a case there is nothing to lose by trying the operation.—*Centrl. f. Chirurg.* 1884. No. 50.

III. ARTHRECTOMY OF KNEE. By R. VOLKMANN (Halle). The functional results of excision of the knee in children are unsatisfactory. Subsequent bony union is not firm, the limb becomes shorter, contractions develop, etc. In adults the results are far better, but, since tubercular joint disease is then almost the only indication, and this attacks principally the synovial membrane—the bone rarely to any extent—the removal of the bony epiphyses is entirely unnecessary. In children the primary foci are usually in the bone, and small, while the articular cartilages are often preserved, or in severe cases a considerable portion of the joint is obliterated. Typical resection can therefore be avoided in a majority of cases. In both children and adults he has of late practiced *arthrectomia synovialis*, i. e., total extirpation of diseased capsule with preservation of bony epiphyses and cartilages. The apparently severe operation is well borne and specially indicated in what was formerly called fungus articularis; here the joint capsule, ligamentous apparatus and parasynovial tissue is transformed into a $\frac{1}{2}$ by 5-4 in. thick, granulating, gelatinous mass, the joint presenting a spherical or fusiform shape.

Provisional to operating he reduces contractures, either by extension or manually under narcosis, and retains by a firm bandage. Larger abscesses, fistulæ, etc., are opened, cleaned out, drained and made as aseptic as possible. It is then necessary to operate before these troubles develop afresh.

He makes a transverse incision and examines with eye and finger to determine whether the capsule must be entirely removed or whether scraping and drainage will suffice; in the former case the cut is enlarged and the patella sawed across. In some cases it may be preferable to open by a flap pointed upwards. He does not recommend the constricting bandage. The extensor bursa is first extirpated, then the parts about the tibia, together with remains of the semi-lunar cartilages. Even on the popliteal side all that is diseased must be cut away. Finally the articular surfaces and exposed portions of epiphyses are closely inspected. The cartilage can in some cases be left, in others, layers of it must be cut off. If possible not a single granulation should be left anywhere. Even walnut-sized tubercular foci in the bone may be scraped or chiselled out without impeding cure; partial excision if necessary. Patella or tendon must be united. Exact coaptation and union except for short drainage tubes, limb in extension, firm antiseptic dressing. Primary union almost without exception. No danger if care is taken in children that too much blood is not lost and the narcosis is not too deep. No shortening, a normal form and an anchylosis giving a firmer support than after exsection. Should deeper caseous foci remain and develop, there is no joint cavity to break into, and a small operation (incision and scraping) would probably suffice. A fuller account is promised.—*Centrl. f. Chirg.* 1885. Feb. 28. Vol. XII, No. 9.

IV. ON BACTERIA IN METASTATIC INFLAMMATION OF JOINTS. By DR. MAX SCHULLER (Berlin). This is a record of cases actually examined, for the most part, however, shortly post mortem. In nearly all cases bacteria are present, and usually more than one form. Special forms, regarded as pathognomonic of the causal

disease, are not characteristic of these inflammations. His cases occurred in pneumonia, scarlatina, diphtheria, erysipelas, typhoid and puerperal fevers and glanders; for comparison he has also included non-metastatic joint-inflammations from neighboring phlegmonous processes. Where pus has formed, bacteria are rarer and stain with greater difficulty; experienced bacteriologists consider them then dead. In relatively simple cases, and in serous effusions, they were easiest to demonstrate.

Two cases *intra vitam* in pneumonia, one of shoulder and one of knee, suppuration in each case. These showed a very few round cocci, either scattered or in rows, and occasionally one of Friedländer's large ellipsoid cocci. Five pneumonia cases post-mortem. Where the effusion was serous and relatively clear there were small round cocci of various sizes, sometimes in twos or even in rows (streptococci)—the latter were usually surrounded by a small, clear envelope—and scattering large ellipsoid micrococci, mostly in twos, and surrounded by a large, clear zone, like Friedländer's pneumococci. In fluid from a pneumonic lung we find approximately the same elements, only pneumococci in greater abundance, and sometimes also slender bacilli.

Five cases from scarlatina. Contents of the joints contained materially smaller round cocci, partly single, more either in twos, rows or groups; in one case solitary bacilli rods, similar to those seen in diphtheria; in two cases, complicated with pneumonia, forms like pneumococci minus their envelopes.

Five cases in diphtheria. Cocci and rows of cocci similar to those above described, besides solitary, thick, sometimes bent or segmented bacilli, like those described by Löffler in diphtheria.

One case from facial erysipelas (knee-joint, post-mortem). Fine diplococci, similar to those figured by Koch, and declared by Fehleisen characteristic of erysipelas.

Four cases (post-mortem) from typhoid. In the serous fluid the same round cocci again, streptococci, and rarely small bacilli, at one time thought characteristic of typhoid. The ovoid typhus bacillus he could not find, nor in a former case (*intra vitam*) any micro-organisms whatever.

Eleven and twelve cases in puerperal troubles, serous, purulent, etc. In all the main form was the streptococcus, besides scattering cocci and diplococci. Members of coccus-chains were of various lengths and sizes, surrounded by small envelope. The same forms were found about the uterus. In some cases of endometritis diphtheritica he found Löffler's diphtheritis bacilli in both places; in one about the uterus, but not in the joint. What part the chain-cocci play in puerperal processes he thinks is not known.

One case from glanders. Glander nodules in synovial membrane. Bacilli, closely resembling tubercular, as determined by several observers, and believed to be characteristic of glanders, were present here. Also small round cocci, occasionally even in the nodules.

In inflammation consecutive to phlegmonous processes, he also found small round cocci and diplococci, especially coccus rows resembling those in diphtheria, and again others like pneumococci.

He concludes that bacteria can travel just as well by the lymphatics as the blood vessels, and that their presence in joints sometimes antedates the inflammation. Forms supposed to be characteristic of the primary disease are much rarer in these joints, and associated with other microorganisms usually also found at the primary seat. Streptococcus, so generally present, seems to be the most important agent. For the present we are hardly warranted, with a few exceptions, in considering these metastases as specific.

Illustrations accompany the article.—*Archiv für klinische Chirurgie*. Bd. 31. Hft. II. 1884.

V. ON HEREDITARY SYPHILITIC DISEASES OF THE JOINTS. By Dr. P. GUETERBOCK (Berlin). In 1878 Gueterbock published four cases. It does not appear to be as frequent an affection as he then thought. He refers to various articles which have appeared on this subject. It is very important to distinguish between this and the much more frequent, but less favorable, joint-tuberculosis. Three new cases are added. The "ensemble" of the case and its course are of great diagnostic value, especially a pseudoparalytic condition of the respective extremity. This latter appears early, and its disappearance indicates a favorable turn of the disease. It seems to be a children's affection, though not as exclusively so as Wegner's epiphysal disease. A sufficient number of cases have not been reported to justify any very exact classification. In fact our knowledge of the affection is still very defective.—*Archiv für klinische Chirurgie*. Bd. 31. Hft. II. 1884.

WM. BROWNING (Brooklyn).

VI. EXPECTANT AND OPERATIVE TREATMENT OF TUBERCULOUS JOINT-DISEASE. By Dr. A. BIDDER (Berlin). The author for his part is persuaded that real tuberculous joint-disease has always a tendency to progress, and, if recovery takes place, it is not without lasting danger for the entire system and functional impairment.

Of his cases, which he gives at length, twenty-nine in number, excluding those cases only observed during a short period of about one year, and all cases of vertebral or pelvic disease, fourteen were treated by conservative methods, including seven in which minor operations were performed, and fifteen were operated upon, mostly by excision, but including four cases of amputation. These cases all occurring in private practice, no experimental investigations were carried out, no inoculations, no cultivations were made, nor were stains employed to detect bacilli (Koch's method not having been then published), but for the most part microscopical examinations were made. The results confirm, as the author believes, that all tuberculous joint-affections tend to an unfavorable course, whatever mode of treatment may be followed, terminating, if not in death, at least in a crippled condition of the limb. He furthermore believes everything dependant upon the constitution; if the latter can be improved, recovery may take place, whatever treatment is employed. The author is consequently in favor of waiving the existing antagonism between conservative and operative methods, and recommends purely symptomatic treatment according to the following principles:

1. Prophylactic treatment is to be attempted; beside procuring good air and cheerfulness of mind for the patient, the food should be so regulated that it contains a large quantity of albumen, fat and soda; a continued supply of the salts of potassium, of amylum and cellulose, as well as indigestible, rich and irritating food is to be avoided.

2. As soon as the virus has entered the body a general medicamentous treatment is to be commenced without loss of time.

3. In cases of foci situated near joints, evident, gouging out of the affected parts, actual cauterizing, or a partial excision is to be performed.

4. In tuberculous affections of the synovial membrane active means are to be resorted to without delay, consisting either in an energetic general dietetic treatment and bandaging, extension, external application of ice and iodine, or else in laying open the joint and removing all the diseased parts, even to the whole of the epiphysis, if necessary.

5. In extensive tuberculous disease of the synovial membrane and adjoining parts of the bone, exsection of the joint is indicated; the operation to be restricted as much as possible to the removal of the diseased parts only, and not as in the typical operation; but if this is not sufficient the joint is to be freely opened up by making large flaps—in the foot, after the method of Bush; in the hip, after Sayre; in the elbow, by adding to the longitudinal incision, running parallel to the arm, another at right angles to it and transversely across the olecranon, cutting it through if necessary, and in the shoulder joint in some similar manner; only the wrist is to be excepted, only longitudinal incisions being permissible here, while in the knee a large flap has already become quite usual. The exposed surfaces and cavities are to be treated with nitric acid, chloride of zinc or preparations of mercury, to destroy the germs, thus giving up primary union.

All the methods hitherto mentioned may still be considered conservative, and are in keeping with the theory of the tubercle bacillus, and afford better results than a purely expectant treatment or amputation.

6. Amputation is, however, to be resorted to in aged subjects and where a long-continued local and general treatment is not possible, when great debility demands prompt relief, when the disease is too extensive to admit of excision, or when the rest of the body is not yet invaded by the germs of tuberculosis.

In cases where the lungs are simultaneously affected, amputation must not be attempted, but repeated evidements and extirpation of glands are to be performed.

In all cases general internal medication is called for; the treatment of the whole disease falling to a great extent into the province of the general family practitioner.—*Deutsche Zeitsch. f. Chirurg.* 1884. Sept.

W. VAN ARSDALE (New York).

VII. A SIMPLE, EFFICIENT METHOD OF TREATING FRACTURES OF THE CLAVICLE. By S. J. ALLEN, M.D. Cut a strip of surgeon's adhesive plaster, eighteen inches long and two and a half inches wide. Fold the strip of plaster *sticky* side out,

so as to make a compress-pad of equal dimensions. Then cut two other strips three inches wide, each, and two feet long—longer or shorter, according to the size of the patient. Raise the shoulder up and back, so as to bring the fragments in apposition. Have an assistant hold the shoulder immovable in this position, whilst the surgeon applies the dressing. Place the compress on the site of the fracture. The heat of the skin will make the compress-pad adhere, whilst the surgeon applies the rest of the dressing. First apply one of the strips of plaster, commencing on the front of the thorax, so that the part that goes over the shoulder shall be equi-distant from each end, and continuing it down the back part of the chest, drawing it taut enough to hold the fragments firmly in apposition. Then apply the other strips in the same manner, but in such relation to the first strip that it shall cross it obliquely directly over the compress. The adhesive plaster compress or pad, folded sticky side out, and applied to the seat of fracture, and held firmly in place by the strips, as above directed, becomes, so to speak, an element in the anatomy of the parts. The compress adheres firmly to the part to which it is applied, and is absolutely immovable; the dressing holding the fractured fragments accurately in apposition long enough to secure union without deformity.

This method is equally successful in the treatment of dislocation of the clavicle and fracture of the acromion process.

VIII. A NEW METHOD OF REDUCING DISLOCATIONS OF THE HIP. By S. J. ALLEN, M.D. An anæsthetic having been administered to the extent of producing complete muscular relaxation, the surgeon stands over the recumbent patient, whose leg he flexes upon the thigh, and the thigh raises to a right angle with the body, bringing the foot between the surgeon's legs, so that its dorsum rests against his nates. If then the surgeon, passing his right arm beneath the flexed knee, lifts the hips of the patient well from the bed or floor, and holds them thus suspended for a very short time, the head of the femur will quickly be drawn back into its socket. The weight of the hips and opposite leg rotates the body outwards, producing just sufficient abduction and extension to quietly draw the head of the femur through the slit in the capsular ligament, and direct it into the acetabulum.

IX. FRACTURE WITH DISLOCATION OF THE ASTRAGALUS; DEATH FROM PNEUMONIA; DESCRIPTION OF FOOT. J. H., 34, jumped from a ladder to prevent a fall, and probably alighted on his heel. On admission to hospital no fracture of the leg could be found, the points of the malleoli being perfectly well marked, but the anterior outline of the external one had not the defined outline of that of the other leg; there appeared to be some fulness anterior to it. The scaphoid tubercle could be felt in its normal position, and the distance between the base of the fifth metatarsal bone and the tip of the external malleolus was normal. The post-tibial and dorsalis pedis arteries pulsated naturally, and the foot was warm. There was marked inversion and apparent shortening of the inner side of the foot, which was in the position of slight equino-varus. On the dorsum, mainly outside the median line of the foot,

and directly in the line of the medio-tarsal joint, there was a projection about half an inch wide, over which the skin was slightly stretched. The fingers passed clearly down behind the projection, between it and the anterior surface of the tibia. The muscles were spasmodically contracted. Chloroform was given. The ankle-joint now appeared abnormally movable, and crepitus was very distinct. The swelling was easily reduced, and the parts appeared to return to the normal.

The patient, however, developed pneumonia, and died nineteen days after the accident.

Autopsy—There was no rupture of the extensor tendons or anterior tibial vessels. The extensor brevis was torn. Most of the ligaments were torn. The internal lateral ligament, however, was intact. The astragalus was divided into two main portions by a fracture, which passed obliquely backwards and inwards. The posterior and outer fragment caused the feeling of fulness in front of the external malleolus. The cuboid was badly crushed.—*Lancet*. 1884. Oct. 4.

X. OLD UNUNITED FRACTURE OF SPINE OF SCAPULA; ANTISEPTIC SUTURE; CURE. By Mr. MAYO ROBSON (Leeds). Patient was operated upon in March, 1884, for ununited fracture of the spine of the scapula, which had been produced by a fall fifteen months previously. Before operation a gap of one inch could be felt between the fragments, and the arm was useless. The operation was done antiseptically. The two surfaces were refreshed and united by two silver wires, which were pressed flat and left in. The result was most satisfactory, the patient having a useful and powerful arm, with all its movements perfect.—*Lancet*. 1884. Nov. 1.

XI. SPONTANEOUS FRACTURE OF BOTH THIGH BONES. By PROF. G. M. HUMPHRY (Cambridge). The patient, a woman, aged 56, was quite healthy. For some years previously she had experienced pains in the middle of the thigh. When walking her left foot caught, and she fell, but she felt the right thigh break before she reached the ground. The fracture was readily united and the limb got quite well, the pains disappearing. Within a year the other limb became painful and broke in an exactly similar way. This also united satisfactorily. Prof. Humphry was unable to say if there was any inflammatory condition of the bone or some disorder of the trophic nerves previous to the fractures, but they were distinguished from other cases of spontaneous fracture in diseases such as mollities ossium, cancer, locomotor ataxy and in violent muscular action.

XII. RESULTS OF TREATMENT OF FRACTURES OF THE PATELLA BY WIRE SUTURES. By Messrs. LYNCH and OGIER WARD. Three cases, one treated by back splint, the others by wire sutures.

In the first case, caused by indirect violence, the separation was very great, but not much effusion. It was treated by a back splint and an arrangement of elastic springs to bring the fragments into apposition.

The other two cases were wired antiseptically, and both did well. The appended table gives briefly the points for comparison:

	Confined to bed.	Crutches or sticks.	Further delay in resuming work.	Total time lost.	Could kneel after accident.
Case 1.....	6 weeks	19 weeks.	2 weeks.	27 weeks.	9 months.
Case 2.....	4 "	2 "	7 "	13 "	6 weeks.
Case 3.....	3 "	2 "	3 "	8 "	5 weeks.

—*Lancet*. 1884. Nov. 1.

H. H. TAYLOR (London).

XIII. EPIPHYSAL FRACTURE OF THE HUMERUS IN THE NEW-BORN. By PROF. O. KUESTNER (Jena). A case with autopsy at end of four months. No syphilis. No atrophy, but loss of function as in all such cases. Epiphysis found to have rotated out 24° before union, despite early treatment. He is of opinion that in all cases where after delivery paralysis of suprascapular nerve is diagnosticated, the real trouble is not nerve injury, but the said fracture. He proposes to treat these cases by rotating the arm outwards to correspond with the epiphysis rotation, and retain it, with the forearm flexed by strips of adhesive plaster.—*Archiv für klinische Chirurgie*. Bd. 31. Hft. II. 1884.

XIV. SUPRACONDYLAR OSTEOTOMY OF FEMUR FOR GENU VALGUM. By DR. E. KLEINMANN. Twenty cases operated in the Tübingen Clinic since 1878 are here tabulated, including one wedge-excision (from the outer side of the femur for genu varum) and one linear osteotomy of femur for a badly united fracture. Four patients were treated on both sides. Average age of the fourteen patients subjected to Macewen's operation was seventeen years; two were between three and four years old. In the earlier four cases a wedge-excision was also performed. During the same period only four cases occurred where osteotomy of the tibia was indicated. Results excellent. He therefore adds his praise of Macewen's method.—*Mittheil aus d. chirurg. Klin. zu Tübingen*. Hft. III. Bd. I. 1884.

WM. BROWNING (Brooklyn).

XV. THE SURGICAL MANAGEMENT OF RHACHITIC DEFORMITIES OF THE LOWER EXTREMITIES. By V. P. GIBNEY, A.M., M.D. It is the author's opinion, indeed his conviction, that a fair proportion of the cases of knock-knee in children in the United States make a spontaneous recovery. His reasons for holding this opinion are as follows: From 1871 to 1877 there were treated at the Hospital for the Ruptured and Crippled 255 cases of genu valgum in children under fourteen years of age. This period antedated the advent of osteotomy, and the apparatus employed was theoretically inoperative. The apparatus seemed practically of service, as in nearly all the cases the limbs were restored to a normal condition. On the other hand, since 1877 the apparatus has been so modified that it exerts pressure effectually, but the percentage of cures is no greater than before. Another reason of faith in spontaneous cure is the scarcity of adult cases in New York City. The larger number of cases in which osteotomy has been performed, in this country at least, have been in children

from three to eight years of age. Similar facts regarding bow-legs might be adduced.

The question then arises, What cases can be safely left to Nature?

1. Children under two years of age presenting bow-legs or knock-knees should not be subjected to operation or mechanical treatment unless the deformity be very exaggerated.

2. Children under three years of age with only a moderate degree of deformity can be safely left to Nature. In cases of bow-legs where there is a general curve extending from perinaeum to ankle without any sharp deviation, apparatus is seldom if ever necessary. On the contrary, when the tibia and fibula are sharply curved at the junction of the middle with the lower third of the leg, an apparatus is almost invariably ordered. Country air and medication receive due notice, as all these deformities are more or less dependent upon rhachitis.

Regarding manual force in the correction of these deformities it is the author's custom to use it under the following circumstances:

1. In patients whose parents are unable to buy apparatus and too improvident to give any attention to its care.

2. Where one has little time to effect a cure.

3. In cases where the bones will thus yield to such force, the other two conditions being present.

The author warmly endorses MacEwen's statement "that *osteoclasia manuelle*, or *mecanique*, has served its time, and cannot be practiced in the presence of the more exact methods of the present day." There are certain cases of these deformities which demand apparatus. The author's rule is to employ springs if he finds the bones can be sprung with moderate manual force. In knock-knee, if the femur is curved and the inner condyle is unusually long, the femoral curve and the ligaments of the knee are tested manually as a guide to the selection of cases for apparatus. The age beyond which these tests fail is on the average about five years. A typical apparatus capable of variation according to the demands of the case is described. The results of osteotomy are next discussed, and the writer formulates the lessons obtained from his personal experience as follows:

1. Exaggerate the correction of deformity.

2. Examine the limb at the end of a week to ascertain whether the amount of correction gained is the amount desired.

3. Do not hesitate to refracture by manual force if it is necessary.

4. With strict attention to details in operating, including Listerism, and in the use of good plaster-of-paris bandages well applied, cases can be treated in a dispensary nearly as well as in a hospital.

5. In dispensary cases do all the operating you propose doing at one sitting. The supra-condyloid operation is *par excellence* the operation for genu valgum.—*New York Medical Journal*. 1884. Nov. 29 and Dec. 6.

G. R. BUTLER (Brooklyn).

XVI. THE MANAGEMENT OF THE ABSCESES OF HIP-DISEASE. By A. B. JUDSON, M.D. The paper is founded on the study of a number of cases in which the discharge of pus was a prominent feature. Cases in which pus is the product of inflammation of soft tissues only are excluded. A comparison between those cases of osteitis of the hip which are free from purulent discharges and those in which such discharges occur, brings to light several circumstances which take away the dread of abscesses. Their occurrence appears to shorten the duration of the affection. The degree of deformity following treatment depends in no way on the presence or absence of purulent discharges. A purulent discharge is more or less an inconvenience, but its occurrence, whether from one aperture or many, is not a cause of anxiety. There is no evidence that the discharge, as such, exhausts the strength of the patient. The precept that pus should be released by an early and free incision is a rule which is not to be always followed in the management of hip-disease. If the collection of pus were the starting point or the main feature of the disease, an early and free incision, as for a furuncle, would be admissible. But in hip-disease the trouble is primarily and chiefly a disease of the bony tissue composing a joint, which is best treated generally by the administration of tonics and the regulation of the hygiene, and locally by fixation and protection from violence. If abscesses occur, it is shown by experience that the retention of pus, even in large quantities, or the presence of a purulent discharge, does not prevent the process of repair. The author has seen no case in which an incision for the release of pus has had a controlling influence for good, generally or locally. Except when tension and pain form decided indications for relief by incision, an expectant treatment is preferable. If the surgeon will control the bone-disease by fixation, protection and hygiene, the abscesses and sinuses will not require the bistoury and drainage tube.—*New York Medical Journal*. 1885. Jan. 31.

XVII. THE PRESENT CONTROVERSIES ON THE SUBJECT OF FLAT-FOOT. By PROF. HERMANN VON MEYER (Zürich). In reviewing a recent work by A. Lorenz on acquired pes planus, the author, who is well known in connection with his original and highly-eminant work on the architectural conditions of the human body, gives an exhaustive expose of the present aspect of the question of flat-foot, which occupies so prominent a place in the surgical topics of the day.

We give his deductions as concisely as possible, yet following his line of argument.

The idea very generally accepted of the arch of the foot being divisible into two longitudinal arches, an inner and an outer one, requires an answer to the following questions: (1) What constitutes the posterior pillar of the inner arch? (2) Which bones form the outer arch? and (3) What connection exists between the two arches? In regard to this last question three views are taken: (a) Szymanowsky combines both arches into one V-shaped arch (Nischengewölbe); (b) others would have them cross, as an X-shaped arch (Kreuzgewölbe), one arch running from the os metatars. I. to the tuberc. extern. ossis calc., the other from the os metatars. V. to the tuberc.

intern. oss. calc. (c) Still others take the external arch for the main support, and have the posterior pillar of the inner arch, represented by the astragalus, rest upon the external arch, which bears the whole of the weight.

The second question, as to the bones forming the external arch, admits of two answers: Accepting the *os calcis* and the cuboid as component parts of the arch, some authors (a) take the capitulum of the fifth metatarsal bone for the anterior pillar, while others (b) take the tuberosity of this bone for it. None of these views, in the opinion of the author, harmonize with the facts, as (ad a) the joint between the cuboid and the fifth metatarsus is not rigid enough to support an arch, but is a very loose joint, and (ad b) in the normal foot the tuberosity of the fifth metatarsal bone does not touch the ground in standing, but is elevated one or two centimeters from it.

An external arch cannot therefore be accepted as existing, and with this stands or falls the whole question as to the divisibility of the arch of the foot into two longitudinal ones. The question then as to the arch of the foot being still an open one, the author, in answer to it, advances his theory that the foot has only one longitudinal arch, running through the line of the middle toe, comprising the *os calcis*, cuboid, 3d cuneiform and 3d metatarsal bones.

In standing, the weight of the body is distributed by the astragalus over the arch. The fourth and fifth toes, as well as the first and second, serve only as side props to the arch, the great toe being used to propel the body in walking, when the force is transmitted to the arch by the scaphoid. All toes but the third can be taken away without damaging the arch; but it falls down if the third toe be removed.

The question as to the resistances offered in support of the arch is next considered. Flat-foot occurs if they do not correspond to the weight carried; the resistance may be either too slight or the weight too great. The foot being constructed after the principle of a bow-string arch, either the ligamentous parts may give way or the bones and rigid parts may be compressed. A difference of opinion again occurs here, some authors believing the muscles in the sole of the foot, and especially those of the leg that have tendons passing around the internal malleolus; others, the plantar ligaments to be the sustaining elements. The author is of the latter opinion, as is also Lorenz, but allows the muscles to have a transitory function in supporting the ligaments.

Another difference occurs as to whether the ligaments may become extended, or whether the bones may not become atrophied by pressure; the author is of the latter opinion, since the fibrous ligaments cannot be stretched, and these parts show no elongation by measurement in flat-foot; and, furthermore, the joint-spaces are not wider open on the plantar than on the dorsal surface in flat-foot.

After contrasting the anatomical, symptomatic, etiological and genetic definitions of flat-foot, the author sets forth his theory of the development of the disease. The astragalus under the influence of pressure from above, turns on its own lower oblique axis and slides down over the upper articulating surface of the *os calcis*. By this rotation, combined with the gliding-down movement of the astragalus, the exter-

nal end of its upper axis (situated in the malleolar joint) is lowered, so that this axis becomes oblique, and consequently, since this axis must retain a horizontal position toward the rest of the foot, the line of gravity falls inside the internal point of support of the foot. This movement, if continued, produces a valgus position, and it is made possible by atrophy of the processus fibularis astragali et colli ossis calcis, through pressure and by a slight extension of the ligamentous parts (the fibroid tissue admitting of no absolute elongation, still it may be stretched until the curled elements are straightened out). It further causes the scaphoid to move forwards and the whole part of the foot anterior to Chopart's articulation to move outwards. Lorenz's theory is, in the main, similar to v. Meyer's; while Henke, whose classic definition of flat-foot is "pes pronatus, flexus, reflexus," bases his deductions upon v. Meyer's axioms. Yet the author's theory may be contrasted to that of the others as setting forth more a lateral falling over of the arch, whereas the others speak of its sinking in.

In conclusion the author contends against the use of pads under the instep, and advocates a high, wide heel, extending well forward, and a pad to be worn in the heel, but on the external side, so that the heel may be pushed to the inside, he having found that an inclined plane falling off toward the outside, instead of keeping the heel in a position at right angles upon it, pushed the heel off outwardly, and so only increased the deformity.—*Deutsch Zeitschr. für Chirurg.* 1884. Dec. 18. Vol. XXI. No. 3.

W. W. VAN ARSDALE (New York).

Gynæcological.

I. THE MORE RECENT METHODS OF CÆSAREAN SECTION. By DR. H. FEHLING. Porro's operation, in the opinion of the author, is the simplest and safest method of performing Cæsarean section, yet it has its adversaries who pronounce it a mutilation. It is followed, however, by no evil consequences, only anticipating the climacterium, and not differing in its effects from simple myotomy. The uterus not being able to fulfil its function of parturition, its removal is indicated, and cannot be called a mutilation. Moreover, the loss of other offspring from such mothers to the world is slight, while it is a cruelty to expose a woman to the dangers of a second Cæsarean section.

The results of the operation are favorable to the mother and also, if it is performed early enough, to the child—the mortality percentage being (if patients already infected by other operations first attempted, and those at the point of death, are excluded) 23.

The author himself advises the following mode of performing Porro's operation:

After disinfecting the skin and opening the peritoneum upon the director, the entire uterus is to be drawn forth outside of the abdominal cavity; an elastic ligature is next to be placed about the inferior uterine segment; the uterus is then quickly incised, the child delivered as soon as possible on account of the asphyxia brought on by the ligature, and, after cleansing the parts, the ligature definitely fastened with silk. The uterus is then removed with the ovaries attached; the pedicle secured in the lower angle of the abdominal wound, the peritoneum being stitched to it below

the ligature. The pedicle is to be cauterized with the Paquelin, iodoform powder sprinkled on; the "funnel" to be filled with tampons of cotton soaked in zinc chloride solution. Dressings with iodoform gauze and cotton, to be changed only in case of fever or when permeated. The author relates five of his cases successfully treated according to this method. He next considers Säger's mode of operating, as first performed by Leopold, in which it is endeavored to prevent gaping of the uterine wound by dissecting off that part of the peritoneum bordering the wound, turning it in and then uniting it with Lembert's suture, passing deep sutures through the muscular tissues as well. The author operated after this manner on a woman dying of meningitis, and the post-mortem proved that the suture had thoroughly and securely united the wound. He considers the operation easily practicable; but as, in the author's opinion, in cases of osteomalacia, the ovaries should be removed in addition to this operation; he prefers Porro's operation as being more simple, and doing away with the danger of hæmorrhage from the veins of the ovarian ligaments. Moreover, pregnancy becomes dangerous after Cæsarean section, as liable to cause rupture of the uterus. Leopold performed this operation three times successfully; Beumer had one unsuccessful case.

Another method is proposed by *Kehrer*, who advises a transverse incision of the anterior wall of the uterus situated a little above the internal os; after delivery the muscular layer and the peritoneum are to be separately united, and then several drainage tubes are to be left leading from the peritoneal cavity.

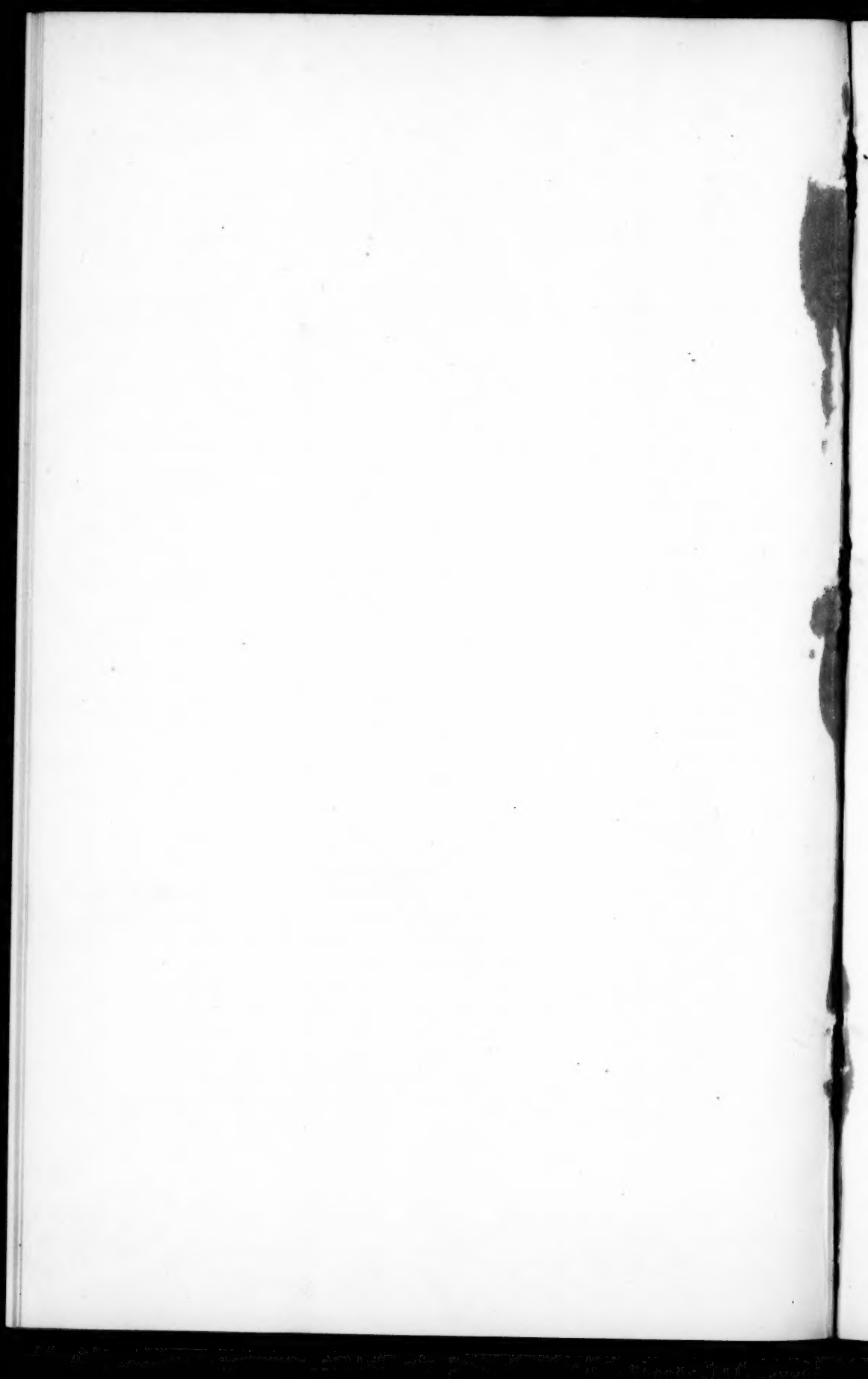
The author does not consider this method an improvement; no elastic ligature can be used; the incision would have to be too great in length, extending more than half around the organ, and being liable to tear still further in extracting the placenta; coagulated blood may remain between the turned-in peritoneal lining; the drainage tubes are unnecessary and dangerous, as, if the operation is antiseptically carried out, transudations and other fluids are readily absorbed. *Kehrer* has had two cases, one of which terminated in death, one recovered.

Another method, proposed by *Frank*, and once performed on a dying patient, consisting in stitching the round ligaments partly together and uniting other parts with the parietal peritoneal membrane, and leaving the uterine wound open, so as thus to form an extraperitoneal ante-uterine cavity, to avoid infection of the peritoneal cavity, is characterised by the author as an experiment upon the cadaver, and is not further noticed.

In conclusion the author formulates the following indications:

Cæsarean section is to be performed (1) after the old method in dying or dead patients; (2) after Säger's method, when the mother does not wish to be deprived of the possibility of having future offspring, and in cases of malformation, conjoined twins and cancer of the cervix; (3) after Porro's method in cases of osteomalacia and pelvic deformity, in tumors of the pelvis, and if the parents desire it, in the interest of the child.—*Volkman's Samml. klin. Vorträge*. 1884. Dec. 1. Serie 9. Hft. 8. No. 248.

W. W. VAN ARSDALE (New York).



FURTHER OBSERVATIONS ON THE TREATMENT OF STONE IN THE BLADDER.

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IN May, 1882, I read a paper at the Liverpool Medical Institution, entitled Observations based upon sixty operations for stone in the bladder in children and adults, including lithotomy and lithotripsy;¹ these remarks were subsequently published in an extended form.²

During the time which has elapsed since the former communication was made, my personal experience of these two operations in public and private practice has been considerably extended, and the occasion is again presented to me for taking a retrospective view of this portion of my work. In thus referring to my experience of these two operations, it is merely with the object of affording some evidence to those who have had no opportunity of witnessing my practice and judging for themselves, that the basis on which certain conclusions are drawn is fairly ample for the purpose.

The diagnosis of stone in the bladder. This, in ordinary cases, is neither difficult nor doubtful; the presence of a stone in a normally shaped bladder, is readily demonstrable by the sound, both to the touch and the ear. Where the bladder has lost its shape, either by the encroachment of the prostate or by the development of saccules, the detection of a small cal-

¹ *Liverpool Med. Chir. Journal*, July, 1882.

² *Lithotomy, Lithotripsy and the Early Detection of Stone, with a Description of a New Method of Tapping the Bladder*; Churchill, London, 1883.

culus is often attended with considerable difficulty, or may be doubtful. In the publication I have already referred to, I drew attention to instances of ill-shaped bladders, having recesses where a stone might lodge, which recesses were practically inaccessible to the sound. The thorough exploration of such bladders, where the prostate is large, is a process which is sometimes not only exceedingly painful, but is followed by consequences of a most disastrous kind. I have seen more than one person die within a week with sudden suppression of urine, after searching explorations of the bladder for a stone that did not exist. Where the stone cannot be readily reached with the sound, means are to be taken to bring the stone, should one be present, in contact with the sound. This may be readily done by a device which I first adopted systematically after reading a paper by Dr. Treyer,¹ where it is remarked, "a most careful search was made by means of sounds of various kinds, but no calculus could be detected till the aspirator was employed, when a distinct click was felt during exhaustion of the water from the bladder, and due to the calculus being carried with force against the eye of the canula by the outward stream. The sound of the fragments clicking against the eye of the canula during the evacuation of the fragments of a calculus, in the operation of litholapaxy, suggested this mode of diagnosis, and I am now in the habit of having recourse to it when the symptoms of stone are well marked, and the sound fails to detect the presence of one in the bladder." In cases where stone is suspected, but cannot be readily detected on the introduction of a sound, by reason of some alteration in the shape of the bladder, I at once substitute what I shall speak of as the aspirator catheter-sound. I have, by this instrument, been enabled in at least a dozen instances, not only to detect the stone without distressing the patient, but at once to remove it.

The apparatus I use for this purpose is Morgan's² aspirator. I have a junction pipe fitted with a stop-cock, between the aspirator and catheter-tube, which facilitates the process of injecting water into the bladder, and enables the surgeon to

¹ *Indian Medical Gazette*, March, 1884.

² *The Lancet*, September 2, 1882.

conduct the examination without wetting the patient or the bed.

In a recent case of irritable bladder with cystitis, which I saw in consultation with Mr. Richard Williams, where we had reason to suspect stone in the bladder, the process was adopted and may well serve as an illustration. We first carefully examined the bladder under ether, with a sound, but failed to detect a stone in consequence of the great irregularity in the shape of the inferior portion of the viscus. The aspirator catheter was substituted for the sound, when calculi were at once felt clicking against the eye of the instrument. In this way, not only was the presence of stone demonstrated, but these were readily removed when we were able to declare that the viscus was free. By this simple process the operation of sounding has been rendered more certain, and freer from those consequences which are sometimes inseparable from the more usual method when required in the case of abnormally shaped bladders.

Stationary Calculi: In the next place, I will refer to what I am in the habit of speaking of as stationary or motionless stones. Amongst the cases treated by lithotomy or lithotrity I can recognize some where the stone had previously been motionless in the bladder.

This term includes those well-known instances where the calculus has been encysted, either as a consequence of a pre-existing sacculated condition of the bladder or prostate. I am not referring particularly to these, but to others where the stone becomes, as it were, moulded into some inequality of the bladder surface. I have had opportunities of studying instances of this kind, both in the operating theatre and the post-mortem room, and shall refer to certain structural effects observed in the bladder-walls, as well as to some results which sometimes follow the removal of these stones. It seems to me that the formation of certain stones within the bladder is closely analogous with the deposition of concretions in other parts of the body in connection with structural alterations in shape and relations. Take for example the formation of tartar about the inequalities and crevices of the teeth. There can hardly be a doubt that the deposition of phosphate of

lime under these circumstances is in the first instance for the purpose of removing depressions which would be inconvenient, if not to some extent detrimental. So long as this deposition is not in excess, nothing is complained of, but a time comes when, by the amount of the deposit, or by its actual pressure on adjacent parts, it becomes inconvenient, and either falls away accidentally or is artificially removed. So with some instances of stone in the bladder which are disconnected with any renal symptoms, and seem to serve the purpose of leveling up inequalities which a growing prostate has in the first instance created.

Nor does the analogy I have taken entirely cease at this point, for we are conscious of the friction and inconvenience the sudden loss of teeth-tartar causes until the process of smoothing down and filling up is again repeated. So in the removal of a motionless stone from the bladder by lithotripsy, it sometimes happens that the first development of bladder symptoms of irritation and distress are coincident with the discovery and removal of these bodies.

Passing on in connection with this subject to pathological and clinical facts, I would, in the next place, point out the structural effects on the bladder walls caused by a motionless stone. These may be defined as consisting in the complete structural deterioration of the bladder in immediate relation with the stone. This was particularly well shown in one instance, where it seemed impossible, under any circumstances, to imagine that the part of the bladder wall upon which the stone pressed could ever again recover its structure or function. The clinical features of motionless calculi are exemplified in those instances where the stone has grown until either by accident or design it has become displaced or has outgrown the limits of comparative comfort.

A few months ago a gentleman consulted me for distressing symptoms of bladder irritability which had suddenly followed a fall from a horse. I cracked and removed a small stone which must have been stationary prior to the fall.

More recently, I examined with a sound, a gentleman who, I had no reason to suspect, had a stone, other than the fact that he had occasionally a little hæmaturia after much exer-

cise—as a rule, the urine was absolutely clear—the patient enjoyed excellent health. The detection of a stone with the sound, and its displacement, was followed by an acute cystitis, which was only diminished by the removal of the stone by lithotrity. For long after the operation, that portion of the bladder-wall which had become deadened and atrophied by constant contact with the stone, furnished an area which, by its inability to discharge its expulsive function, was a source of constant annoyance which could only be alleviated by regular catheterism and ablutions.

The study of the recorded instances of lithotrity shows examples where the removal of a stone gave little or no relief. In one instance the continuance of these symptoms after the removal of the stone by crushing by an experienced surgeon, led to the suggestion that it was possible a portion of stone had been left behind and was impacted somewhere. I performed cystotomy, but nothing was discovered to account for the symptoms beyond what was believed to be due to the altered condition of the bladder walls, both in shape and structure.

The popular notion that a stone in a bladder is something like a die in a dice-box, no doubt applies to a considerable number of cases; in these the symptoms are usually well marked, and whatever operation is selected is followed by satisfactory results. In the cases referred to of motionless stones, where, by reason of the atrophy the bladder walls have undergone, complete relief after lithotrity is never entirely obtained, the question naturally forces itself upon us whether with our improved means of draining the bladder, a lithotomy is not the better operation, when the bladder is then rendered incapable of emptying itself by its own unaided efforts.

The results of modern lithotrity, as a whole, are so strikingly beneficial and satisfactory in cases where this operation is distinctly indicated, that we are apt to overlook those instances I have referred to and have endeavored to explain, where, though life is preserved, yet the relief is not as complete as we could desire. It is only by a careful scrutiny of a number of cases, and the results obtained by lithotomy, that we are enabled to discover shortcomings in the proceeding

relatively to individual cases, which are not explainable by the mere removal of the stone from the bladder, however skillfully it is effected. From such imperfections no series of lithotrity operations, indiscriminately recorded, is altogether free.

Some years ago, a patient who was well known to many of my dressers and two or three of my house surgeons, from the fact that I used often to send for him when I wanted to demonstrate and to teach the operation of lithotrity, by reason of the tolerable certainty with which I could depend on finding a small but well-formed phosphate stone in his bladder. His history was that he had a large prostate, and was not particularly careful in keeping his bladder clean. After I crushed a stone for him, he did not get a complete relief for some little time; then he enjoyed a period of comfort, followed again by signs of irritability. Then again the same process was repeated. His bladder was a very shapeless affair, the irregularities of which were constantly being filled up with a sort of phosphate mortar, which up to a certain point seemed to give him at least a temporary relief. I might mention other instances of this kind of stone formation. We can further study it with advantage in the coating process of hard calculi and foreign bodies when dropped or introduced into the bladder. Again, these resting places for urine or for calculi in an ill-shaped bladder serve to explain certain phenomena frequently observed in persons with large prostates, which are not always at once obvious. We all know how liable such persons are to recurring attacks of cystitis, and though these symptoms are for the most part traceable to cold and to errors in diet, the purely mechanical manner in which the local inflammation is produced, is sometimes not fully appreciated. So long as healthy urine traverses the pouched bladder, no harm follows its temporary lodgment, as the constant mixture of recent secretion with that which may have been retained for some time, prevents the product becoming injurious. But let urine, charged with lithates, as in febrile attacks, or with uric acid, as in gout-storms, remain in these recesses of the bladder even for a comparatively short period, irritation is created, mucus is thrown out in excess, and all the factors are pro-

vided for the production of urine-decomposition, and co-incident with this a corresponding degree of cystitis.

An enquiry into the causation of stone as effecting the urinary passages, indicates at least two conditions under which these concretions are formed: (1) by altered relations of the urinary fluids, which are capable of being determined by general causes, and (2) by structural changes which favour a stagnation of the urinary fluids and the precipitation and decomposition of their respective constituents.

The shape of many urinary calculi, before they have been cased with phosphates, seem to indicate the frequency with which they have been roughly cast in the depressions and crevices of a bladder, distorted by the encroachment of the prostate.

Cases will be found recorded where symptoms of stone have shown themselves with much severity after the body has been subjected to a severe shock, as leaping from a carriage in motion. It has been noticed in some instances of this kind that the stones, after removal, presented indications of their recent fracture, and this theory, it is supposed, served to explain the suddenness and severity of the symptoms produced. In one case which came under my observation, two angular stones were removed by me by lithotomy, and it was suggested that they had been subjected to a fracture, and hence the acuteness of the symptoms produced. I feel sure, however, that this was not the case; they had been cast in an ill-shaped bladder, and the accidental disturbance of one by a sudden shock applied to the body, was followed by the escape of the other into the general cavity of the bladder, just as the displacement of one brick in a wall causes its neighbour to become loose, and ultimately to fall away.

Pouching of the bladder.—Changes in the shape of the bladder, for the most part due to excess in growth of the prostate, preventing the complete discharge of the urine spontaneously, have an important relation to stone and its treatment. In the first place, as I have endeavoured to show, they are a frequent cause of stone; secondly, they explain the concealment of calculi, and lastly, by the changes a motionless calculus is capable of effecting in the bladder-wall in contact with it, is

explained the imperfect relief that sometimes follows its removal by lithotrity, as well as the recurrence of the disorder.

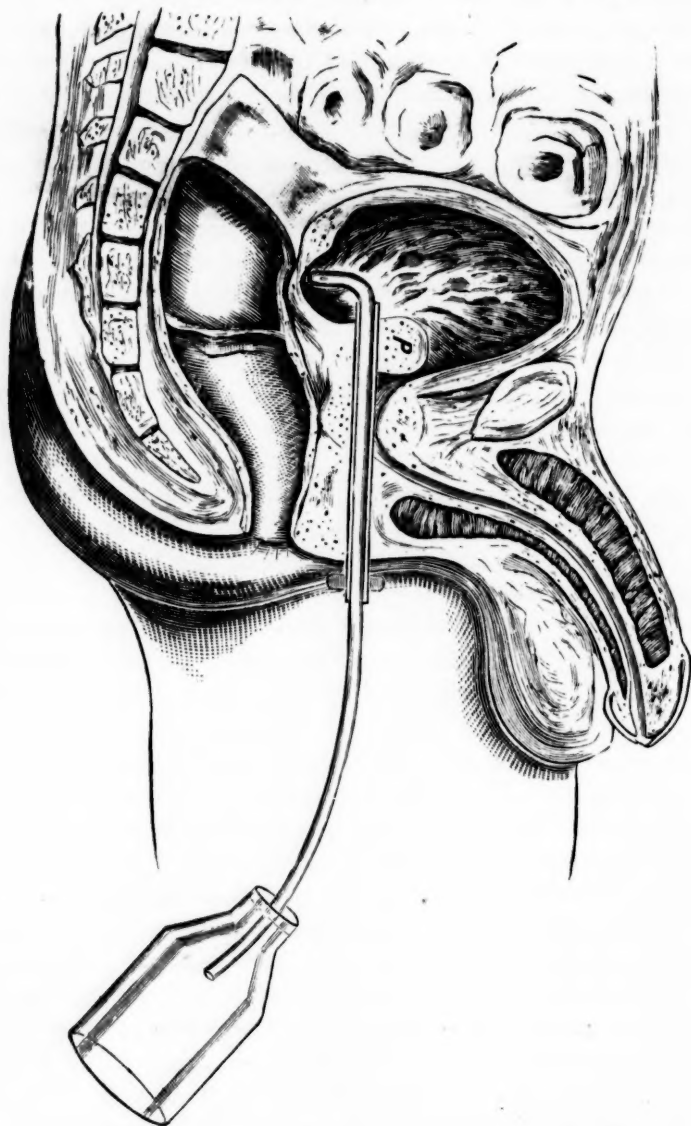


FIG. I. BLADDER, WITH DOUBLE DRAINAGE TUBES.

I have also endeavoured to point out how, under such circum-

stances, it may be necessary, either after a trial of lithotrity, or even without it, to proceed to lithotomy, not only for the purpose of draining such recesses in the bladder, but of removing them.

There are many instances of chronic cystitis connected with stone, and following upon alterations in the form of the viscus, due to old standing stricture and obstruction, where it would be desirable if we were merely to regard the bladder in the light of an abscess cavity which was most imperfectly drained by an abnormal urethra. The recognition of such a view of this position has often been the means of saving life under apparently desperate circumstances, and would, I am sure, contribute still further toward this end, if we were to hesitate less in adopting the course indicated. The principle is a well tried one in surgical practice, where a suppurating cavity has to be dealt with. I have recently described in detail the application of these principles to the bladder, together with such appliances as I have found best adapted to the special object before us.¹

The following case will illustrate many points in connection with these remarks :

A gentleman, aged 59, came to me from Scotland in October, 1883, with the following history : In 1880 a stone was removed from his bladder by lithotomy by the late Professor Pirrie, of Aberdeen. A month previously an attempt had been made by the same distinguished surgeon to remove it by lithotrity, but without success. For six months afterwards he was relieved, when his symptoms returned, which Dr. Pirrie considered was due to an enlarging prostate. In 1882 he was again operated on by another surgeon in Scotland, but nothing was discovered. A week after this operation it was noticed that there was a communication between the bladder and bowel, and ever since this a portion of the urine passes into the bowel. His bladder symptoms were not relieved by the second operation.

He now complains of a great uneasiness after making water, continued irritability, and pain at the end of the penis ; he is unable to sit on an ordinary chair, and is only comfortable when reclining with his knees apart, supported by pillows. He micturates about every hour, both by day and night, passing each time a small quantity of offensive

¹ *The Lancet*, November 8, 1884.

urine. When he has an action of the bowels his urine is usually mixed with blood. Before the first operation his weight was 14 stone; it is now 10 stone. The journey to Liverpool was accomplished with much difficulty and pain.

On examination I found that the bladder contained over three ounces of offensive residual urine. The prostate was large and nodular, and in front of it there was a communication between the membranous urethra and the bowel behind. He takes five grains of morphia every twenty-four hours. He cannot pass a motion with comfort except by reclining on his side over a bed-pan. I sounded him, and above a large prostate found a calculus which seemed tolerably stationary. The conclusion I came to was that he was suffering from his prostate, which had led to pouching of the bladder and the formation of calculi; this I determined to attempt to remedy by operation, the patient expressing the hope that I should be able to remove his prostate, which he believed was the cause of all his troubles.

On November 5th, the patient was placed under ether by Mr. A. Barron, and I had the valuable assistance of Mr. Mitchell Banks in carrying out the plan of procedure I had determined upon, which mainly consisted in endeavouring to permanently improve the condition of the prostatic urethra, which clearly was responsible for the other symptoms described.

Having opened the prostatic urethra by the usual incision for lateral lithotomy, so as to permit the entrance of my finger into this portion of the canal, I freely divided its floor, including almost the whole thickness of this part of the prostate, upon the staff well carried into the bladder. This enabled me to have access by means of the section to either side of the gland. I then endeavored, with the assistance of volsella, to draw the prostate towards me, with the view of enucleating it, or pulling away some portion of it with my finger; this I was not successful in doing, except to a very limited extent. The gland seemed very indurated, and I was not able to find any portion of it that was loose or pediculated, or any part that could be included in a noose or compassed within a large tonsil guillotine. I thus had to content myself with the free incision through the floor of the gland, which I had made partly with my knife and partly with the instruments I had employed for attempting enucleation. Through this opening I readily introduced a pair of lithotomy forceps, and extracted three phosph-uric calculi of moderate size, which clearly, from their shape, had not been moving about much within the interior of the bladder. I then passed in through the wound a gum-elastic lithotomy tube about as thick as my thumb and eight inches long, by means of

which the prostatic incision was to be kept open and the bladder drained. The operation was followed by some rather free oozing of blood, which was controlled by temporary pressure with lint round the tube. The treatment consisted in keeping in the tube, and seeing that the bladder was thoroughly drained by the double tube, as shown in the drawing (Fig. 1).¹ The immediate effect of this treatment was that the constant pressure of the large tube on the prostate produced a marked effect in reducing the size of the enlarged gland, for it is noted, November 27, that it is now found that a shorter tube is more comfortable and drains better; consequently, from this date the tube is reduced by cutting off lengths from time to time of about half an inch. The urine about this period was also noted to drop from the tube with an acid re-action.

December 12. Withdrew the tube temporarily, and passed a No. 12 bougie (English) along the whole length of the urethra; this was repeated daily until the 17th inst., when the bladder-tube was finally withdrawn, catheterism and the retention of a catheter for a few hours daily being substituted. By this means the continuity of the urethra was established. The lithotomy tube had been retained for six weeks after the operation, by which time it was concluded, from the ease with which the ordinary catheter passed, that the cleft in the prostate had been permanently established. Of course new tubes were substituted when ever the gum elastic became worn or rough by constant contact with the urine. I would mention here that for a similar purpose I have tried specially made silver and vulcanite bladder-tubes, but I prefer the gum-elastic.

On December 31, the patient returned home. His recovery was complete, except the atonic condition of the bladder, which had been too long standing. His present condition is best described in his own words: "I am quite a new man, have no pain of any kind; can walk and sit like other men, and travel anywhere. I am still obliged to make water through a catheter, but I can do so without pain or trouble. I make water with the catheter as quickly as I could do in the ordinary way. I have increased from ten to thirteen stone in weight, and attend my works every day."

The chief point of interest in this case was the recognition that physical changes in the shape of the bladder were alone responsible for all that followed, and that no method of treatment which failed to deal directly with the change would be at all likely to give satisfactory results. Nor must the course

¹ *Vide*, page 506.

that was pursued in this case be regarded as exceptional and difficult to accomplish; other illustrations, if necessary, and space allowed, could be added. Further, the treatment of the enlarged prostate by direct interference has previously to these instances been approached by me in different ways, and led to the adoption of the practice I have just referred to. I would ask permission to remind your readers of the communications I have made from time to time directly bearing upon this point. In 1881, I published some remarks to show the advantages of mechanical treatment in the prevention of prostatic obstruction to micturition.¹ The extended adoption of this practice has furnished results which have been highly satisfactory. Unfortunately, I have not yet been able to prepare a second edition of the pamphlet, which was out of print a few months after it was issued.

In 1881, I recorded in the *Transactions of the Royal Medical and Chirurgical Society*, of London (Vol. LXV.), a case where a tumor of the prostate was successfully enucleated, with remarks on the removal of such growths. This patient, as well as another, who was similarly operated upon by my colleague, Mr. Bickersteth, are both perfectly well up to this date, and have had no recurrence of stone or of difficulty in micturition.

In 1884, at the International Medical Congress at Copenhagen, I read a paper entitled the treatment of certain cases of prostatic obstruction by a section of the gland, based upon a series of cases where I had then operated with good results. These cases show not only how the form of the bladder may be permanently improved by thorough drainage, but that atrophy of the enlarged prostate can be artificially produced.

Lastly, as indirectly bearing upon the subject, I would mention two other cases under my own observation, where the prostate was submitted to operation—first, a case where the bladder was tapped and drained (the canula being retained for some weeks) through the perinæum² and hypertrophied prostate. This person, though now approaching ninety years of age; is alive and well, and is known to have undergone atrophy of his prostate.

¹ The Prevention of Stricture and Prostatic Obstruction; Churchill: London, 1881.

² *British Medical Journal*, December 24, 1881; April 8, 1882.

Secondly, a case where a carcinomatous prostate was removed through a central perineal incision.¹

I venture to submit that this series of cases has an important bearing on the management of the prostate when enlarged and associated with either primary or secondary stone in the bladder.

Large stones and their removal.—Owing to improved means of diagnosis, and to the fact that a good surgeon may now be found wherever civilization has advanced, instances of very large calculi are comparatively rare. That stones grow by retention within the body, and when small, may be painlessly and safely removed, are truisms which cannot be too generally known or acted upon. In my own series I have only met with three examples where the stones were between four and six ounces in weight. As to the safest method of removing calculi of these and larger dimensions, I entertain but little doubt.

Lithotrity under these circumstances, as a rule, is certainly out of the question, though in the case of soft phosphatic stones, considerable masses may, in this way, be removed. A large stone may, and frequently has, a very soft outside, but proves very hard after the outer layer has been peeled off. I have seen more than one lithotrity abandoned for this reason. With the exception of some phosphatic calculi, lithotomy, I believe, still remains alone applicable to the largest varieties of hard urinary calculi.

As to the precise method of cutting, lateral lithotomy, with some modifications, has shown itself equal to dealing with stones; at all events up to nearly nine ounces in weight,² and is to be advised. Some extremely large calculi have been successfully removed by the lateral method, by surgeons practising in India and the East, where large stones are not uncommon, in consequence of the procrastinating habits of the natives. My friend, Dr. Machie, of Alexandria, gave me numerous illustrations of this from his own practice in lithotomy, which have been very successful.

¹ *The Lancet*, September 20, 1884.

² Dr. Underhill: *The Lancet*, Vol. II., 1882; Mr. Spanton: *British Medical Journal*, January 31, 1885.

In formulating rules for our guidance in the case of large stones, which, until their removal has been accomplished, we can only roughly estimate by size, and not by weight, it will be observed that the difficulties connected with their extraction by the lateral method arise either (1) from obstacles presented by the soft parts, or (2) from the bony pubic arch. On seizing a large stone with the forceps, after the bladder has been opened by the lateral incision, it is not difficult to determine which of these two obstacles we have really to deal with. If, as is usually the case, it is the soft parts, there are several additions to the ordinary incision which will safely provide more room. Of these, I may particularly mention two, viz: (1) A bilateral section of the prostate, without any corresponding division of the external skin or textures composing the perinæum. This has so far sufficed in the instances where I have practised it. And (2) a bilateral section of the prostate, including the corresponding thickness of the perinæum covering it. This, of course, forms a triangular wedge or cone, having its apex towards the pubes and its base to the rectum. I have not had occasion to do this, so I will quote from a case recently recorded by Mr. Spanton, where he successfully removed a stone consisting of phosphates and uric acid, and weighing eight and a half ounces:

"The operation was commenced with the usual lateral incision for lithotomy. The forceps being introduced, the stone was grasped, but the incision was found to be too small to allow extraction. The incision was then enlarged to the greatest possible extent, and the stone was again grasped, but without success. Another incision was then made on the right side, converting the previous incision into a bi-lateral one, but as this did not admit of the extraction of the stone in its entirety, a pair of bone forceps was introduced into the bladder, the stone cleft, and the pieces severally removed. *Subsequent treatment:* The triangular flap was first supported and held in position by a pad in the perinæum, with a T bandage, and subsequently by one silver wire suture. The operation was performed on November 22, and the wound was entirely healed on January 14th."¹

¹ *British Medical Journal*, January 31, 1885.

When, however, the difficulty of extraction is occasioned by a normal, or by an abnormally contracted pubic arch, the line of proceeding will obviously be different. If by ordinary extracting forceps, or even by cutting forceps, carefully introduced, as in Mr. Spanton's case, it is found impossible to break up the stone, all further attempts at breakage had better be abandoned, and we should at once proceed to open the bladder above the pubes.

It may be urged, if it is known beforehand, as it should be, that the stone is unusually large, why not proceed with epicystotomy in the first instance? There are two answers I would give to this proposal. First, you do not know for certain what you can extract by a lateral lithotomy, with its modifications, until you have tried. I have known more than one instance where an epicystotomy was almost decided upon, but where the stone came out through the perinæum. Secondly, if extraction by a lateral lithotomy has to be abandoned, by reason of the impossibility of getting the stone through this way without jeopardy, you are in no worse position, and your patient is in a better one relatively to the circumstances of his case, if the alternative operation has to be then proceeded with. Frère Côme, whose high operation for stone was so successful, was in the habit, before performing epicystotomy, of opening the urethra in the perinæum. Nor are instances wanting in more modern practice: cases by Billroth, Patterson of Glasgow, Howe of New York, and others, with substantially the position that is here urged.

An epicystotomy, unless, as it were, you turn your patient upside down, by making him lie on his belly for a couple of months after the operation, means opening the bladder without providing a convenient exit for the urine until the process of healing is almost accomplished. Nothing I have yet seen in connection with the operation of epicystotomy, except in females, where the conditions are very different, would induce me in the case of vesical stone, to resort to it without previously verifying the necessity by a lateral perineal incision. The latter need only amount to a digital exploration of the bladder and the stone it contains, and if abandoned at the last moment, it will be found to contribute in no small measure to

the success of what has been known for centuries as the high operation for stone.

Irritability.—In the two following instances, death followed the operation which was selected. In both, the issue from the first seemed unavoidable; both had their lessons to teach, lessons which have already proved useful to myself, and may not be unacceptable to others:

J. W., æt. 64, came under my notice in consultation with Dr. Hugh Williams, during 1883, for irritability of the bladder and recurring attacks of cystitis. He was sounded on several occasions, but no stone could be felt. In consequence of the continuance of his symptoms, he came into the Infirmary. His prostate was large, and I had reason to believe that something might be concealed behind it. What I determined to do was to make a section of his gland, as I have already described.

On January 5, 1884, he was placed under ether, which permitted the sound to be used with more freedom than previously; this led to the detection of a stone in the position that was suspected. Lateral lithotomy was performed, and a section made of the floor of the prostatic urethra, and three triangular stones, which lay concealed and wedged in above the prostate were removed. The double tube was introduced. This patient was an unfortunate subject for any operation, as he became much depressed about his business affairs, and the possibility of the loss of his situation. Though his kidneys were not the soundest, he never had a bad symptom, yet he failed to make progress in repair beyond a certain point, and died five weeks after the operation. I could not obtain a post-mortem examination.

This case not only served to substantiate the views I have stated in reference to motionless calculi and their effects on the water of the bladder, but to illustrate that the accepted method of sounding or investigating the condition of the interior of the bladder, was not as perfect as could be desired. Had I then been provided with the aspirator catheter-sound, these stones would have been detected earlier and removed.—possibly without resorting to lithotomy.

The second fatal case was that of a feeble, anæmic looking man, who was sent to me by Dr. E. Riding. He had the appearance of being completely worn out, and was consequently not a favourable subject to attempt to relieve by operation. Examination by the sound indicated the presence of a large oxalate stone, which I decided to remove by lithotomy, which I did on July 25, 1884.

The operation was followed, shortly after the patient was removed to

bed, by a sharp attack of hæmorrhage, to suppress which, Brown's tampon was effectually used. In spite of every care, a tendency to bed sores showed themselves from the first; the patient also became slightly delirious. On the night of the 29th he was greatly alarmed by the conduct of a semi-delirious patient in the same ward, which shocked him much, and he died unexpectedly on the 30th, five days after the operation. A post-mortem examination showed nothing wrong in the wound, or anything to account for the bleeding. The kidneys were sound. The hemorrhage, I believe, just turned the scale, which was very fairly balanced, against the patient, and determined the issue.

The treatment of immediate and secondary hæmorrhage in cases of lithotomy, prostatotomy and cystotomy, has given me much consideration, as in a large experience of these operations, instances of these complications have from time to time arisen. When an artery has been divided, and is evidently spouting, it must be tied; this can generally be done with the aid of retractors without much difficulty; to plug a spouting vessel, if it is possible to avoid it, is to court the recurrence of a bleeding. More usually I have noticed, as in section of the prostate and adjacent parts, this bleeding is of a freely oozing nature, as if from spongy textures, but in this way many ounces of blood may be quickly lost. I have invariably noticed in the cases referred to, when the bleeding has been of this oozing nature, how easy it is to control it with the point of the finger introduced and well carried into the bottom of the wound, sometimes even by the finger in the rectum. For the finger in the wound I now (since the fatal case just recorded) substitute a lithotomy tube of a size which precisely fits the wound-cut in the bladder that has been made. The drawing, Fig. 2, represents the exact size of one of the tubes I employ. I have them made of different calibres, so that they may fit with tolerable accuracy. They are tied into the bladder by the usual perineal band, and drainage through them is carried on by the inner rubber tube (marked B), which can be changed at will, and by which the bladder is washed out and the urine carried into a vessel by the patient's bed side.

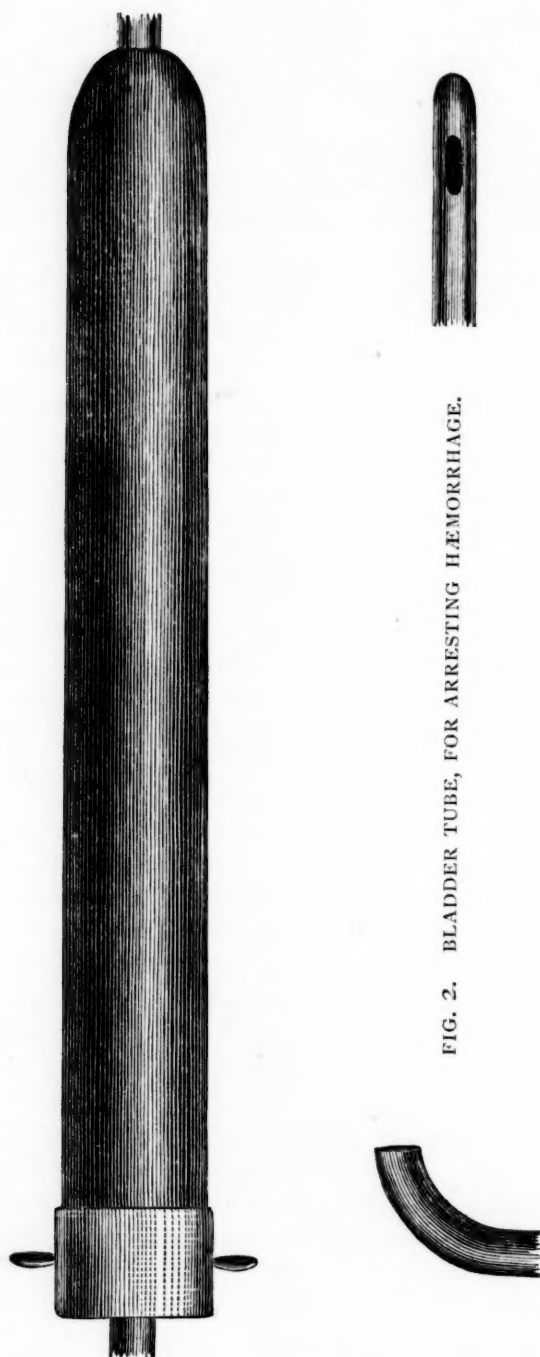


FIG. 2. BLADDER TUBE, FOR ARRESTING HÆMORRHAGE.

These tubes have now been tried on several occasions, with entire success. If I am at all doubtful about bleeding, I introduce one of them, and retain it for twenty-four hours or so, according to circumstances. Since I have used them, I have had no fear or trouble in dealing with primary or secondary hæmorrhage, either in lithotomy or in some of the deep sections of the prostate or prostatic bars I have made. It has, in fact, proved a most reliable plan of exercising digital compression on bleeding vessels, which cannot be tied, and where styptics of all kinds are undesirable. These tubes can be readily removed; thus the wound is kept clean and free from the collection of septic influences. Though the size of these tubes may be taken as representing considerable openings into the bladder, I do not think exception can be taken to them on these grounds. When the proper time arrives for closing a bladder, which, in its construction, provides cause for the production of stone, for the maintenance of cystitis, and the symptoms that one or other of these, conjointly or independently, produce; when urine escapes from the open bladder with an acid, and not a foetid alkaline reaction, then it will be found that a large opening heals quite as quickly, and much more soundly relatively to the parts above it, than a small one.

AN EXPERIMENTAL AND CLINICAL STUDY OF AIR-EMBOLISM.¹

By N. SENN, M. D.,

OF MILWAUKEE, WIS.

SUDDEN and unexpected death during an operation is a calamity which never fails to strike terror to the heart of the boldest surgeon. Although death is a frequent and familiar visitor wherever human beings exist, nevertheless its sudden and unforeseen advent conveys with it more than the usual

¹ Read before the American Surgical Association at the meeting held in Washington, D. C., April 21-25, 1885.

halo of sadness, and when such a scene transpires in the operating room it leaves impressions which neither time nor space can erase. Disasters of this kind come without warning, and usually at a time when least expected. The surgeon who has the misfortune to meet with such an accident is not only destined to burden his memory with the unpleasant remembrances of the incident for the remainder of his days, but in addition he is often made an unjust object of reproach by those who are unable to appreciate the nature of the case. His conscience may be relieved by a favorable verdict regarding his conduct and management of the case before the only competent tribunal, composed of his colleagues and the medical press, but that most uncertain of all things, public opinion, will in all probability be arrayed against him. In one sad moment the object of his ambition, the ultimate aim of his life-work has suffered irreparable loss. The surgeon who seeks to maintain and advance the interests of his profession as well as his own reputation should familiarize himself with all the causes and conditions which may precipitate such an unhappy result, with a view to adopt and apply timely prophylactic measures. Believing that it is good practice to prepare for war in time of peace, I intend on this occasion to call your attention to one of the most dreaded and, I may add, one of the most uncontrollable causes of sudden death—I allude to air-embolism.

After consideration of the subject from an historical, experimental and clinical standpoint, I shall endeavor to point out the conditions remote and direct which give rise to this accident. The different explanations of the immediate cause of death will be discussed, and, finally, I shall offer some practical suggestions relating to the prophylactic and therapeutic measures.

By air-embolism I understand the presence of free atmospheric air within the vascular system during life, and in sufficient quantity to give rise to symptoms of obstruction. It is a true embolism inasmuch as the location of the volume of air which constitutes the embolus is always some distance from its point of entrance. The presence of air in a vessel offers the same mechanical obstruction to the flow of blood as a solid substance, and gives rise to the same disturbance of circulation in

the tissues supplied by the vessel. An air-embolus differs from an ordinary embolus in that when once introduced into the circulation it is capable of being broken up or divided by the blood current and the action of the heart, and on this account usually becomes the source of multiple emboli. Pathologically it always differs from a solid embolus, inasmuch as it is more likely to be removed by absorption and is less liable to be followed by thrombosis. Air-embolism is always due to the introduction of atmospheric air into a wounded or injured vein, and, in contradiction to the ordinary form of embolism, it is primarily most always found in the right side of the heart and in the venous system. With a view to study the immediate effects of the presence of a considerable amount of air on the heart and the vessels, it becomes necessary to allude to the experiments which have been made where embolism was artificially produced by the introduction of solid substances into the circulation.

I. ON THE IMMEDIATE CAUSE OF DEATH BY RAPIDLY FATAL EMBOLISM.

The most interesting experiments on embolism were made by Virchow in 1847 and by Panum in 1854-1855, and although the conclusions of these experimenters are somewhat at variance, our present knowledge on this subject is based upon the conjoined labors of these distinguished writers.

Virchow was convinced that his experiments were conclusive in showing that complete embolism of the pulmonary artery would prove invariably fatal in a short time, while partial obliteration of this vessel produces either no symptoms at all or only temporary dyspnœa, restlessness and a sense of oppression. He gives the following explanation to account for the immediate cause of death in cases of complete obstruction in the pulmonary artery by a large embolus. (*Gesammelte Abhandlungen*, p. 297.) "The first effect of the pulmonary ischæmia is the interruption of the supply of oxygenated blood to the coronary arteries of the heart and the arteries of the body, as well as the stasis of the venous blood in the right side of the heart, the coronary veins and the veins throughout the body. These conditions result in the arrest of the heart's ac-

tion in the diastole, the tetanic contractions of the voluntary muscles, the retardation of respiration, the dilatation of the pupils, the protrusion of the eyeballs, etc., and very soon complete death."

Panum, by a series of very ingenious experiments, disproved the assertions of Virchow, that a lack of arterial blood in the coronary arteries produces instantaneous arrest of the heart's action. (*Experimentelle Beiträge zur Lehre der Embolie*, Virchow's Archiv., Vol. XXV., p. 308.) In a rabbit, where the ventricular contractions had ceased for fully fifteen minutes, and where only the right auricle continued to pulsate, he injected a warm black mass, composed of tallow, wax and soot, into the aorta, for the purpose of studying more accurately the anatomical relations of the coronary arteries. The injection penetrated the smallest vessels. The right auricle continued its rhythmical movements for three and a half hours after the injection was made,—the heart and lungs having been removed from the body. In the second experiment he divided both pneumogastric nerves in a dog, and then opened the chest and pericardium and passed a double ligature underneath the innominate artery; after tying the upper ligature and drawing the lower tight, the artery was opened between them, and a silver tube introduced and secured in the vessel with a proximal ligature. The silver tube was connected with a glass tube by interposing a piece of rubber-tubing. To the distal end of the glass tube another piece of rubber was attached, and all tubes filled with oil, which was kept from leaving the tube by a clamp. The aorta was compressed with a spring forceps above the origin of the innominate artery, and the same black mass was injected through the tube into the aorta. The oil and black mass entered the vessel, and, after closing the aortic valves, filled the coronary arteries, which were found completely blocked with the foreign substance. The movements of the heart were carefully observed before, during, and after the injection was made. Before the injection the contractions were regular, 80–90 per minute during the injection, on account of the higher temperature of the injection (45° C.), the contractions became more rapid, and in the left side of the heart, which was distended with blood, they were less forcible, an

occurrence which could readily be accounted for by the mechanical obstruction to the outflow from the left ventricle. All the chambers of the heart continued to contract for five minutes after the injection was complete. Six minutes after the injection was made the contractions of the left auricle ceased. The movements of the ventricles were feeble, but could be plainly seen. The rhythm of the ventricular contractions grew slower than the contractions of the right auricle, and, at the same time were less regular. After 25 minutes the right auricle pulsated 48, the ventricles 24 times per minute. Five minutes later the pulsations of the auricles and ventricles were the same in frequency. Forty minutes after the injection the ventricles contracted 24 times per minute to eight auricular pulsations. Fifty minutes after the injection the ventricles made 23 rhythmical movements to three of the auricles. After one hour the movements of the heart again became regular, inasmuch as the auricle and ventricles pulsated 13 times per minute, and in such a manner that the movements of the ventricles followed immediately after the contraction of the auricle, and were followed by a long diastolic pulse. Seventy-five minutes after the injection the movements of the left ventricle ceased, while the right half of the heart contracted regularly eight times per minute. Two minutes later the ventricle contracted only twice to eight movements of the auricle. Ninety minutes after the injection the right ventricle ceased to beat, while the right auricle continued to contract for six hours and ten minutes after the injection, making toward the last only one movement per minute. After all pulsations had ceased for a while, they were renewed by blowing upon the heart. These contractions continued for seven and one-half hours after the injection, and even after they had ceased for a second time, they were again excited by mechanical irritation. During this observation the heart was kept at a temperature of 12.5 to 13° C., under a glass bell in which the air was saturated with moisture. An examination of the heart showed that the coronary arteries were completely distended with the black mass, and that capillary vessels and coronary veins were blocked with oil. A few drops of oil, but nothing of the black mass were found in the right auricle. The aorta, near the heart, was filled

with the injection material; the aortic valves were so completely closed that nothing had penetrated into the ventricle. In two other instances the coronary veins were made impermeable in a similar manner, and the contractions of the heart were temporarily arrested by electric irritation of the pneumogastric nerves. This experiment was repeated in both animals more than twenty times, and always with the same uniform results. If the electric stimulation was continued, after the heart had ceased to contract, the movements were again excited, but this always required a continuation of the current for at least a minute. If the electrodes were removed after the heart ceased to act, it required twenty seconds before the contractions were re-established, the movements being always more rapid than before the irritation was applied. From these experiments, we are forced to conclude that embolism of the coronary arteries is insufficient to produce instantaneous arrest of the heart's action. Virchow quotes Erichsen as having observed prompt cessation of the movements of the heart after ligation of the coronary arteries, but Panum doubts the possibility of performing this operation upon the heart of a living animal.

The same observer studied embolism of the pulmonary artery by injecting an emulsion of gum arabic, in which were suspended small pellets of black wax, into the jugular vein of a medium sized dog. Eight c.ctm. of the emulsion were injected. All signs of life and all reflex movements ceased three minutes after the injection. After death the large vessels were tied, in order to ascertain the exact quantity of blood contained in each side of the heart. The right side contained 112.35 grms. of dark-colored blood; the left contained only 6.45 grms. In another experiment he injected coarsely powdered charcoal in suspension into the jugular vein of a dog. The time which elapsed between the injection and cessation of life was longer than in the preceding case, consequently the left side of the heart contained a larger amount of blood, although the quantity was small when compared with that of the right side of the heart. In all cases of death resulting from embolism of the pulmonary artery, the amount of blood found in the left side of the heart is proportionate to the com-

pleteness of the obstruction in the pulmonary artery. The left side of the heart is never found completely empty, as the labored respiratory movements will force the blood which is present in the pulmonary vein and its branches into the left side of the heart. If, instead of using small emboli, large plugs are injected, as was done by Virchow, the blood contained on the distal side of the obstruction will pass through the pulmonary circulation and reach the left side of the heart; consequently, in such cases more blood will be found in the left ventricle. Panum asserts also, that the cessation of the heart's action does not invariably take place so early that it can be considered as the primary and direct cause of death. As a rule he found the heart pulsating after the death-struggle had been initiated, from arrest of innervation from the cerebro-spinal centre. In some instances the heart continued to pulsate after all signs of animal life emanating from the brain and spinal cord had ceased. Shortly after respiration was arrested, the heart did cease to pulsate, and, as Virchow has stated, in the diastole.

According to Panum, the cessation or continuation of the heart's action exerts no influence for good or evil in cases of extensive embolism. He claims that if the cessation of the heart's action takes place as one of the first effects after embolism of the pulmonary artery, as was noted in Virchow's first case, it must be regarded, under certain circumstances, as being the result of irritation of the pneumo-gastric nerves, so much more so, as the heart, in the case referred to, again began to pulsate after the thorax was opened. As a rule the heart's action is arrested by distension of the right ventricle.

Other observations tend to show that the distension of the right ventricle is the cause. The excess of carbonic acid gas and the diminished supply of oxygen must also be taken into account. Other experiments have demonstrated that carbonic acid in concentrated form, injected into the heart after its removal from the chest, readily leads to diastolic paralysis, and that the organ commences to beat again when exposed to air. The arrest of the heart's action is due to mechanical dilatation and the presence of an excess of carbonic acid. The first and most constant symptom resulting from sudden and extensive

embolism is a high degree of anæmia in all visible parts of the body. On post-mortem examination the white substance of the brain is completely bloodless, especially if small and numerous emboli have been injected. This general anæmia is followed by tetanic stretching of all extremities, involuntary discharges and deep convulsive inspiratory movements. Ligature of both carotid arteries does not produce such an intense ischæmia of the brain. If the vertebral arteries are ligated at the same time, the tightening of the ligature of the second vertebral artery produces syncope and convulsions, but the symptoms are less intense than after sudden fatal embolism of the pulmonary artery. Panum also induced cerebral anæmia by injecting black pellets of wax, suspended in an emulsion, into the crural artery of a dog, throwing the injection in a central direction through a catheter which had been passed into the artery near the heart, producing thus multiple embolism in all of the smaller arteries. The animal lost only a few drops of blood, and no air entered. The animal was taken immediately with tetanic convulsions, involuntary discharges, and all organs accessible to the eye presented an extremely anæmic appearance. All reflex symptoms were arrested after one or two minutes. Two other experiments were followed by the same results. In all cases the small wax pellets were found in large numbers in the small vessels of the brain, as well as in all other parts of the body. In four other dogs cerebral embolism was avoided by introducing the catheter only as high as the ribs, and by injecting slowly. During the injection, a peculiar tremor was observed which affected the muscles of the lower extremities, which, however, soon ceased, and gave way to complete paralysis of both motion and sensation, as well as complete arrest of all reflex movements. One of the animals survived the experiment 22 hours, the second nine and one-half hours, the third six hours, and the fourth five hours. The small vessels of the spinal cord were found obstructed by the small wax pellets; the vessels between the emboli and the heart were much dilated, and showed many small extravasations. The spinal cord was the seat of red softening, which was more conspicuous the longer the life of the animal was prolonged. The spinal cord above the middle of the dorsal region, and the brain, were

normal in appearance, although scattering pellets were found here also. It will be seen that Panum, in contradistinction to Virchow, attributes the immediate cause of death, in cases of rapidly fatal embolism, to acute cerebral anæmia. From a study of the literature on air embolism, it is evident that the immediate cause of death has been assigned by different pathologists to one of the following conditions:

1. Mechanical dilatation of the heart and paralysis of the organ in the diastole.
2. Acute cerebral ischæmia.
3. Asphyxia resulting from mechanical obstruction to the passage of the blood through the pulmonary circulation.

As we shall see further on, death from air embolism is not always produced in the same manner; the mode of dying varies, and is modified by:

1. The amount of air admitted.
2. The time which has elapsed between the ingress of air and the fatal issue.
3. The location and distribution of the emboli.

II. HISTORY OF AIR-EMBOLISM.

Surgeons and pathologists have for a long time been aware of the deleterious effects of free atmospheric air in the vascular system. The danger attending the forcible insufflation of air into the veins of animals was well known to many of the earlier physiologists. Among the first to study the effects of the introduction of air into veins may be mentioned Redi, Wepfer, Camerarius, de Heyde, Harder, Bohnius, Boerhave, Lancisi, Morgagni, Valsalva, Bichât and Nysten.

As early as 1667, Redi killed animals by intra-venous injections of air. He observed during his experiments that the pulse became intermittent, an occurrence which he attributed to the passage of a large air bubble through the heart. His followers, who repeated the experiments, soon discovered that after forcible insufflation of air into veins the air became diffused, inasmuch as at the post-mortem examinations they found it present in the right auricle, the coronary vessels, and, in the shape of air bubbles, in the smaller vessels. Mery made

the observation that in opening the abdomen of a dog and puncturing the vena cava above the origin of the emulgents, as the vein became emptied of blood, it filled with air which ascended with the blood current and entered the right side of the heart. Haller witnessed the same phenomenon in cold blooded animals after wounding some of the large venous trunks. He has shown that it was from this source that the air was derived, which Redi, Caldesi and Morgagni had seen circulating in the vessels of the same animals. He claimed that air is never seen in vessels when the necessary precautions are exercised to prevent its introduction through a wounded vein. Nysten found that by injecting air slowly into a vein, so as not to produce death of the animal, that the coloring of the arterial blood was rendered imperfect. He satisfied himself that this change was not owing to the embarrassment of respiration. Insufflation of oxygen had no effect in preventing or correcting this change of color in the arterial blood. The literature on insufflation of air into veins is quite prolific, and the subject cannot be justly dismissed without an allusion to the following names: Blochmann (*Aër in venis causa mortis*, Dresden, 1843); Bouillaud (*De l' introduction de l'air dans les veines*, Paris, 1838); Gain (*de aëris ingressione in venas*, Berlin, 1865); Maguin (*Etude expérimentale sur l'introduction forcée et sur l'entrée spontanée de l'air dans les veines*, Nancy, 1879); Méric (*Recherches sur l' introduction de l' air et des gaz qui le constituent dans le système veineux*, Paris, 1866); Valkenhoff (*De aëris in venas ingressu ejusque effectu lethali*, 1840), and Laborde (*Effets de l' introduction de l'air dans la circulation artérielle*, Compt. rend. Soc. de biolog., Paris, 1873), names which are intimately associated with the experimental part of the history of air-embolism.

It was not long after the deleterious effects of free atmospheric air in the veins of animals had been studied experimentally before the same symptoms were observed in man by the accidental admission of air into wounded veins during operations, and in some of the first cases the presence of air in the veins and right side of the heart was demonstrated by post-mortem examinations. Although a number of honest and reliable surgeons, prominent among them Velpeau and Fergus-

son (*Lettre sur l' introduction de l' air dans les veines de l' homme*, Gaz. méd., Paris 1838, pp. 113-121), have denied that a sufficient amount of air can be admitted through a wounded vein to produce sudden death, this assertion is no longer tenable in the face of such a large number of well authenticated cases as have been recorded in surgical literature by equally conscientious and competent observers. Since the publication of the first well authenticated case observed by Beauchêne and described by Magendie, the following authorities, placed in alphabetical order, have reported similar cases :

Assmus, *Zur Casuistik des Lufteindringens in grössere Venenstämme*, Med. Zeitung, Berlin, 1842, XI., p. 104; Amussat, *Introduction de l' air dans les veines*. Bulletin Acad. de Méd., Paris, 1836, I., pp. 894-899 (1837-38); II., p. 363, 461; Barlow, An attempt to remove a tumor on the neck, entrance of air in vein, sudden death, Med. Chir. Trans. (1830), XVI., pp. 28-35; Chassaniol, *Observation de l' entrée de l' air dans les veines pendant l' amputation du bras, dans son articulation scapulo-humérale*, Union méd., Paris, 1869, VIII., p. 428; Clémot, Lanc. franc., 1830, Tom. I., p. 357; Coolidge, Case of sudden death from entrance of air into the jugular vein, *N. Y. Med. Gazette* (1841-2), I., p. 305; also *N. Y. Med. Journal* (1847), Vol. IX., pp. 199-201; B. Cooper, Case of alarming syncope from the admission of air into a vein during amputation of the shoulder joint, *London Lancet* (1843), Vol. I., pp. 448-451; Cormack, Case of death from the entrance of air by a rigid vein in the neck, opened accidentally by a seton-needle, *London Medical Journal* (1850); Delaporte, *Extirpation d' une tumeur située au cou; introduction de l' air dans le système vasculaire*, Bulletin Acad. de méd., Paris (1837), I., p. 132; Delpech, Mém. des hospitaux du midi. (1830), No. 16, p. 231; Fischer, H., *Ueber die Gefahren des Lufteintritts in die Venen während einer Operation*, Volkmann's Sammlung Klin. Vorträge, Chirurgie No. 34; Gunn, Syncope from entrance of air into the facial vein, *New York Medical Journal* (1852), p. 356; Heckford, Four cases of entry of air into the circulation, *Medical Times and Gazette*, London (1867), I., p. 137; Koestlin, *Ein Fall von Luft im Herzen*, Med. Correspondenz-blatt d. württ. ärztl. Ver. Stuttgart (1857), Vol. XXVIII., pp. 316-321; De Lavacherie, *De l' opportunité de l' extraction des tumeurs du cou non susceptibles de résolution; réflexions sur l' introduction de l' air dans le cœur par des veines ouvertes accidentellement*, Mém. Acad. roy. de méd. de Belge. Bruxelles (1849), II., pp. 305-376; McPharlin, Death from entrance of air into the veins in a case of compound fracture, *Hosp.*

Gazette (N. Y., 1878), III., p. 20; Massart, *Etude nouvelle sur l'entrée de l'air dans les veines, dans les cas de plaie ou d'opération chirurgicale*, Annales Soc. de méd. d'Anvers (1854), Vol. XV., 5, 57, 113; Mercier, *Journal des connaissances* (Sept. 1836), p. 108; Meyer, F., Case of injury of the vena jugularis interna, entrance of air, sudden collapse, recovery, *Med. Archives*, St. Louis (1869), Vol. III., pp. 408-410; Miner, Tumor in the neck, admission of air into the vein, death, *Buffalo Med. and Sur. Journal* (1864), pp. 336-338; Mirault, Thèse. Paris. (1832); Mott, Entrance of air into facial vein, *Medico-Chir. Trans.* (1830); Piachaud, *Mort par introduction de l'air dans une veine, pendant l'ablation d'une tumeur du sein avec ganglions dans l'aisselle*, Echo méd.; Neuchât (1857), p. 768; Porter, On the entrance of air into the veins as a cause of death, *Journal American Med. Ass.*, Vol. III., No. 20; Rauch, *Lufteintritt in einen verletzten grösseren Halsvenenast und seine Folgen*, Oest. Med. Wochenschr. Wien (1845), pp. 199-201; Roux, *Journ. hebdom.* (1833), Vol. II., p. 64; Schmid, *Das Eindringen von Luft in eine Vene während einer Operation am Halse*, *Corresp. blatt d. württ. ärzt. Ver. Stuttgart* (1851), Vol. XXI., p. 53; Schweickhart, *Eindringen von Luft in die Venen; Tod durch Gehirnschlag*, *Mitth. des badischen ärzt. Ver. Karlsruhe* (1852), XI., pp. 69-71; Smith, R. W., Abscess behind the pharynx, entrance of air into veins, *Dublin Quarterly Journal Med. Sciences* (1844), Vol. XXV., p. 497; Tadlock, entrance of air into divided internal jugular vein, ligation, recovery, *Am. Journ. Med. Sciences* (1875), p. 280; Ulrich, *Tod durch Eintritt von Luft in die Venen*, *Med. Zeitschrift des Vereins für Heilkunde* (1834, November), p. 132; Warren, J. C., two cases of accidents from admission of air into the veins during surgical operations, *Am. Jour. Med. Sciences* (1832), pp. 545-548; Warren, J. M., tumor connected with the sartorius muscle, secondary cancer of breast, operation, entrance of air into the vein, recovery, *Surg. Observations* (Boston, 1867), p. 529; Wattmann, *Prager Viertelj.* (1844), Vol. II., p. 191.

This list is, of course, not complete, nor does it represent all cases of accidental introduction of air during operations, but the names which are quoted ought to be accepted as sufficient guarantee by the most skeptical, that the fear of this accident is not a myth, but a reality, substantiated by many a sad experience.

III. INTRA-VEINUS PRODUCTION OF AIR.

Spontaneous production of air within the blood vessels of recently deceased persons has been repeatedly observed, and

to it has been assigned one of the causes of sudden death. That the air thus produced is a direct product from the blood appears to be negatived by the fact that its occurrence has usually been traced in connection with sudden and exhaustive hemorrhages. It is, in fact, in persons who have died from hemorrhage, that air has been found in greatest abundance in the veins. Lieutaud (*Hist. Anatomy, Med. Obs.* 55) reports the case of a girl who died suddenly in a state of syncope, after having been repeatedly bled, and in whom the cerebral veins and choroid plexus were found impacted with air. M. Rerolle (*Thèse de Paris, No. 129, 1832*) has published several cases of the kind, where profuse hemorrhage had existed; in one of fatal epistaxis, the heart, arteries and veins contained large quantities of air. Dr. Graves has noticed emphysema of the abdominal parietes in a sufferer from repeated attacks of epistaxis. M. Rerolle conjectures that, in such cases, air is absorbed by the radicles of the pulmonary veins—hence, the air would have no claim to be considered adventitious. (*Todd's Cyclopedia of An. and Physiol., Vol. IV., Part I., p. 145*).

It is, however, more logical to assume that, inasmuch as in almost all cases the supposed intra-venous origin of air took place consequent upon severe losses of blood; hence, likewise in connection with loss of continuity of the vascular system, that, owing to the sudden loss of intra-vascular pressure the air may have been aspirated through the openings of some of the bleeding vessels.

The quantity of air found in these instances has been so small, that it has been impossible to make a chemical examination to determine its identity with atmospheric air. In cases where air was found in blood, without loss of continuity of the vessels, it is not impossible that the supposed air was not atmospheric air, but a gaseous product liberated from the blood, or generated in the tissues, producing a gas-embolism which interferes with the function of circulation in a similar manner as when the obstruction is caused by atmospheric air.

IV. EFFECT OF THE HEART AND RESPIRATION ON THE VENOUS CIRCULATION.

As the state of the intra-venous blood pressure constitutes the most important elements both in the prevention and causation of aspiration of air into veins, this subject must be briefly alluded to, in order to determine conditions which act as exciting causes. For the most reliable and comprehensive information on this subject we are indebted to Jacobson (Dr. Heinrich Jacobson, *Ueber Blutbewegung in den Venen*, Virchow's Archiv., Vol. XXXVI., p. 80.) The observations were made on sheep. To determine the effect of the heart's action upon the venous circulation, he measured the blood pressure in veins with the manometer. These measurements were made on veins in close proximity to the heart, as the lower portion of the jugular and subclavian, as all attempts to approach nearer the heart seriously impaired the normal physiological conditions of the respiratory and circulatory organs. His measurements gave the following results:

In the left vena anonyma	. . .	— 0.1 mm. Hg.
In the right vena jugularis	. . .	+ 0.2 " "
In the right vena subclavia	. . .	— 0.1 " "
In the left vena jugularis	. . .	— 0.1 " "
In the left vena subclavia	. . .	— 0.6 " "

The following are his observations on some of the more distal veins in the same animal:

In the external facial	. . .	+ 3.0 mm. Hg.
In the internal facial	. . .	+ 5.2 " "
In the brachial	. . .	+ 4.1 " "
In a branch of the same	. . .	+ 9.0 " "
In the crural vein	. . .	+ 11.4 " "

The experiments of Ludwig and Mogk, although made in a similar manner, led to more variable and inconstant results; at one time they found the blood pressure in the crural vein 6.8 mm. Hg., while on another occasion, under similar circumstances, it measured in the same vein only 1.9 mm. Hg. Donders refers this want of uniformity to the respiratory movements of the chest, believing that the aspiratory movements of

the chest affect the venous circulation more than the *vis a tergo* from the capillary system. Poiseuille claimed that in his experiments the manometer was affected by the respiratory movements of the chest only, when it was inserted into veins in close proximity to the heart, as in the lower portion of the jugular and the external iliac veins, while in more distant veins the column of mercury was not affected by the movements of the chest. Volkmann obtained the following measurements:

In the facial vein of a goat	41 mm. Hg.
In the jugular vein of a goat	18 " "
In the métatarsal vein of a calf	27 " "
In the jugular vein of a calf	21.5 " "
In a subcutaneous vein of the neck of a horse	44 " "
In the jugular vein of the neck of a horse	21.5 " "

Magendie found the blood pressure in the external jugular vein of a dog 18 mm. Hg., and in the crural vein 50 mm. Although the measurements of the intra-venous blood pressure taken by different observers are at great variance, and although their figures are indicative of the opinions held by the different experimenters as to the effect of respiration upon the return of venous blood, yet they all agree in locating the minimum degree of intra-venous pressure in the veins nearest the heart. The effect of respiration on the venous circulation was thoroughly investigated by Magendie. He introduced an elastic tube into the internal jugular vein, and observed that blood would escape only during expiration. The same experiment was made on the crural vein by directing the tube towards the heart, followed by the same result. The suction force exerted during inspiration was sufficient to counterbalance the auricular contractions. In making these experiments, air was frequently drawn into the heart during forcible inspiration. Barry introduced through the jugular vein of a horse a bent tube of glass, one extremity being passed into the right cavity of the heart, or the vena cava, and the other into a vessel containing a colored fluid. He found that with each act of inspiration the liquid rose in the tube, demonstrating the effect of a notable suction force. He found that this suction force was increased by preventing the entrance of air into the chest by the trachea. He was of the opinion that this force from the chest was ex-

erted, not only in the large veins near the heart, but throughout the entire venous system.

Schweinburg (*Die Bedeutung der Zwerchfell contractionen fuer die respirat. Blutschwankungen*, Du Bois-Reymond's Archiv., 1881, p. 475) has studied the effect of respiration on the circulation by producing paralysis of the diaphragm by section of the phrenic nerves. He states, that when diaphragmatic respiration has been artificially arrested, the difference of blood pressure observed during respiration ceases entirely, or nearly so. From this he concludes that the action of the diaphragm causes, to a certain extent, these differences. Even after opening the abdominal cavity, the difference in blood pressure is very slight. As the principal cause in abolishing the effect of respiration upon the circulation, he looks upon the compression of the abdominal vessels during inspiration, causing the increase of blood pressure during inspiration and its diminution during expiration, by diminishing intra-abdominal compression. If the jugular vein in an animal is exposed, direct observations show conclusively that the direct influence of inspiration cannot be felt much beyond these vessels. The flaccidity of the walls of the veins will not permit the extended action of any suction force, but the flow of blood in the distant veins is accelerated by the intermittent emptying of the veins by the respiratory act. Barry and Donders ascribe to the aspiratory function of the chest the principal motor in the return of the venous blood. Donders estimated the aspiratory force of the inspiratory movements of the chest at seven mm. Clinical observation and experimental research have established the fact that the venous circulation is directly influenced by respiration within a certain area, and that aspiration of air, in the majority of cases, takes place in those veins thus affected, thus constituting the justly and much dreaded "danger-zone." Instead of speaking of the effect of respiration on veins as a cause of aspiration of air, some authors speak of the vein-pulse, and limit the danger-zone to such veins as pulsate. Under certain circumstances the pulsations of the arteries are communicated directly to the veins through the capillaries. In such instances it is necessary that the arterioles are relaxed, as has been ascertained by

Bernard in observing the circulation in glands during their physiological activity. If a vein be opened in a gland during its physiological activity, the blood retains partly its arterial hue and escapes in intermittent jets, as from a divided artery. According to recent physiological investigations veins continue to pulsate independently of the arterial system and the cerebro-spinal centres. Luchsinger (*Von den Venenherzen in der Flughaut der Fledermäuse*, Pflueger's Archiv., 1881, Vol. XXVI.) examined the venous pulsations in the wings of bats. Contrary to Schiff's observations, he found it independent of the central nervous system. Division of the brachial plexus and separation of all tissue connections between hand and body, with the exception of the vessels, did not arrest it. If artificial circulation was established in the organ after amputation, rhythmic venous contractions would be seen even twenty hours after death. Intra-venous pressure was found to be of great importance in these experiments; as soon as it was increased the vein began to pulsate. The seat of these rhythmic contractions, Luchsinger placed in the walls of the vessels, or rather in their muscular structures. They are probably regulated by the central nervous system. Slight increase of warmth and electric tetanization accelerate the contractions. High temperature causes diastolic stasis. Nitrite of amyl increases the pulsating only to arrest it later. Schiff has since satisfied himself that these pulsations continue after division of the brachial plexus and ligature of the vessels, and even in the veins in detached pieces of the bat's wing. Brunton (*On Pulsations in the Jugulars and other Veins*, Med. Press and Circular, July 2, 1879) has made the same observations on man in regard to the effect of increased intra-vascular pressure in producing venous pulsations in the larger veins. He finds that the pulsation of the jugular vein is sometimes confined to one side, the left one. In one of his cases, the jugular on the left side was much more distended than the right jugular, the distension increasing whenever the vein was compressed just above the clavicle. Whenever this compression was repeated in the rhythm of the pulse, the increase and decrease of the blood in the vein assumes the character of pulsation, and for this reason the author has arrived at the conclusion that the

venous pulsation in such instances is caused by compression of the vena anonyma by the aorta. All cases of unilateral jugular pulsation observed by Brunton occurred in anæmic women. In one of these the pulsation took place only while the patient was affected by some emotional excitement; in another, only during expiration. In rabbits the author has repeatedly observed rhythmical contractions of the pulmonary veins, the vena cava inferior, and the portal vein, occurring immediately after the death of the animals. These pulsations were present either after complete cessation of the heart's action, and sometimes even before death, and, as the pulsations were more frequent than the heart's action, it was plain that they occurred independently from any contraction of that organ. In consequence of long continued pressure on a vein, the author has seen tonic contractions to take place, especially in smaller veins, and this may explain the cause of some of the irregularities of the circulation and subsequent transudation.

Riegel (*Zur Kenntniss von dem Verhalten des Venensystems unter normalen und pathologischen Verhältnissen*, Berl. Klin. Wochenschrift, 1881, No. 18) has made vein pulsation a special subject of investigation, and as the result of his researches he has come to the following conclusions: I. There exists in the normal condition a pulsation of the jugular vein. II. This normal pulsation is always anadicrotic, *i. e.*, its wave rises in two distinct intervals. This anadicrotic wave corresponds, in contradistinction to the pulsation of the carotids, to the diastole of the heart. The short catacrotic line or wave corresponds to the systole; the anacrotic, to the diastole of the heart. Synchronous with the systole the contents of the vein are emptied into the heart, while during the diastole stasis takes place in the veins. King (Guy's Hosp. Repts., 1837, p. 108), in his interesting essay "On the safety-valve function in the Right Ventricle of the Human Heart," demonstrates the existence of venous pulsations in the veins of the hand, the median veins of the forehead, and the external jugular, which he observed after a full meal. The pulsations were made plainly visible by taking a delicate thread of sealing wax about two inches in length, one end of which was fixed across the vein with a little tallow, so as to make a long and excessively

light lever, capable of indicating a very slight movement in the vessel. The movements of the lever produced by the vein pulse correspond in frequency with the pulsations of the arteries in the same vicinity, but did not correspond in time, as the venous pulse followed the arterial systole, showing conclusively that it was not due to the impulse of an adjacent artery. The pulsations could only be caused by the arterial wave being continued to the veins through the capillary vessels. In certain pathological conditions, independently of valvular lesion of the heart, he noted a marked increase in the venous pulsation in the dorsal veins of the hand, and other vessels distant from the heart. The subject of the vein pulse affords an interesting topic in physiology, but in connection with this paper it is only mentioned in order to show that the intra-venous tension is only slightly affected by it, and consequently it can exert no direct influence in causing aspiration of air into veins. The venous pulsations, which directly influence the return of the venous blood to the right side of the heart, occur synchronously with the movements of respiration, and are observed only in the veins which are in close proximity to the heart, and in venous channels with firm unyielding walls. The introduction of air can only follow in wounds of vessels where the intravascular pressure is subjected to great variations, either from normal anatomico-physiological conditions or the result of pathological alterations. All causes which prevent a prompt collapse of the walls of a wounded vein must be considered as predisposing causes, while all conditions which tend to produce a vacuum in the wounded vein act as determining causes. The location of the former corresponds to the point of injury, while the latter are always represented by the aspiratory action of the chest during inspiration.

V. ASPIRATION OF AIR INTO THE SUPERIOR LONGITUDINAL SINUS.

Nearly all of the older physiologists were of the opinion that aspiration of air into veins could only take place in vessels which were in close proximity to the heart and within reach of the venous pulse. Mery claimed that the effect of thoracic aspiration on the venous circulation extends to the sinuses of

the dura mater and the venous channels of the diplöe of the cranial bones. Bernard was aware that air might enter the sinuses in case these structures were wounded, as this accident occurred a number of times in his experiments on animals where the superior longitudinal sinus was opened for other purposes. He believed that the air, after entering the sinus, reaches the heart through the vertebral veins and the vena azygos. Death, in such instances, took place in eighteen minutes, while forty-five minutes were required if death resulted from hemorrhage alone.

Volkman's case, reported in another part of this paper, demonstrates to a certainty that death may be caused by the entrance of air through a wound of the longitudinal sinus, and although this is the only authenticated case on record, similar cases have undoubtedly occurred before, but the real cause of death was not recognized, and the fatal result was attributed to some other source. This subject, of aspiration of air into the longitudinal sinus, was made the object of experimental inquiry by Genzmer, one of Volkman's assistants. (*Exstirpation eines faustgrossen Fungus duræ matris, tödtlich verlaufen durch Luftintritt in den geöffneten sinus longitudinalis*. Verh.d.deutschen Gesellschaft f. Chirurgie, Vol. VI., p. 32.)

The experiments were made on dogs, as this vessel in rabbits was found too small for the operation. Nine experiments were made. The animals were made partially insensible by morphine injections. The skull was exposed by an incision which was carried from the occipital bone to the forehead; with a small straight chisel a section of bone about six ctm. square was mapped out by cutting through the external table, anteriorly to the prominentia occipitalis externa, and which was completely detached with a hollow chisel. The dura mater having thus been freely exposed, the posterior portion of the longitudinal sinus, which was about two mm. in width, was made accessible about its middle. Between two small hooks the sinus was made tense and divided transversely, carefully guarding against injury to the sub-arachnoidean space. In some of the experiments the wound was kept patent by making traction on its margins with the hooks; in others this precaution was unnecessary, as the edges of the wound retracted sufficiently to keep it open. For several minutes after incision the bleeding continued profusely; the blood was quite red, and escaped with some degree of force, the pulsations being plainly visible and synchronous

with the heart's action. The stream was also perceptibly increased and diminished with the respiratory movements of the chest. After a few minutes had elapsed, the hemorrhage became less profuse. In case the animal died, the heart and lungs were removed, after carefully tying the large vessels so as to prevent the escape of air from the heart. To secure accuracy in ascertaining the presence of air in the heart, this organ was opened under water, when the rising bubbles would indicate its presence. In three cases, in two of them the animal breathed through a tracheal canula, the double rhythm in the blood column was lost soon after the sinus was opened, and the blood continued to flow until the animal died, which was usually the case after 35, 40 and 53 minutes, the stream from the peripheral end of the sinus growing constantly less during this time. In all of these cases the central end of the sinus was completely filled with a thrombus, and no air was found in the heart. In two other cases the double rhythm continued until life was extinct, which was the case after twelve and nineteen minutes. After the first two or three minutes, the bleeding diminished, and, by removing the blood from time to time with a sponge, it could be seen how air was aspirated during inspiration through the gaping wound. During forcible expiration, or on compressing the chest, air-bubbles escaped with the blood from the wound from the proximal end of the sinus. As the bleeding diminished, air aspiration became more copious and more frequent. An examination of the cadavers of these animals revealed that the right side of the heart contained air and spumous blood. In the next two cases, artificial dyspnoea was produced; in one instance by dividing both pneumogastric nerves, in the other by closing the tracheal canula through which the animal was breathing. In the first case air entered early, and the animal died in 16 minutes; in the second case air entered freely during the forcible inspiratory efforts; the animal died in 24 minutes. In both these cases air was found in the right side of the heart, and in the subpleural vessels. In the last two experiments the animals were killed 15 and 60 minutes after the sinus was opened, by puncturing the brain with a needle. In the first case a considerable amount of air was found in the right side of the heart; in the second case the amount of air contained in the right side of the heart was less—the apparent difference being due to the presence of a thrombus in the central end of the sinus in the last case, which prevented further ingress of air.

In recapitulation it may be stated, that in six out of nine experiments, air entered the longitudinal sinus, thus proving conclusively that wounds of this great reservoir of venous

blood are not only dangerous from the loss of blood, thrombosis and inflammation, but may also become the direct cause of sudden death by admitting air into the venous circulation.

EXPERIMENTS.

These experiments were made by the writer for the purpose of ascertaining more fully the conditions which determine the entrance of air into a wounded longitudinal sinus, and, at the same time, to obtain reliable information concerning the prophylactic measures, as well as to determine the best methods of arresting hemorrhage in wounds of this vessel. All operations were made under antiseptic precautions; when not specified, no anæsthetic was used. The field of operation was cleanly shaved, and the surface thoroughly disinfected with a 5 per cent. solution of carbolic acid; during the operations frequent use was made of the irrigator, using a warm 2 per cent. solution of the same antiseptic. When the animal survived the operation the wound was closed with continued catgut sutures, dressed with iodoform, and a compress of salicylated cotton retained by a roller bandage. The operation consisted in making a longitudinal incision in the median line of the skull, reaching from the external occipital protuberance to near the upper extremity of the frontal sinuses. The soft parts, with the periosteum, were separated and reflected on each side, so as to lay bare the bone over a sufficiently large area for the ready use of the bone-cutting instruments. A medium-sized trephine was applied over the middle of the longitudinal sinus, and a button of bone carefully removed, so as to prevent injury to the underlying vessel. The enlargement of the circular aperture was effected with a hollow chisel and Luer's bone-forceps. The opening in the bone was made of an oval or oblong shape, with the longest diameter parallel to the sinus, in order to bring into view a large extent of the vessel with a minimum destruction of the cranial vault.

Experiment No. 1.—Small skye terrier, weight 12 pounds. Ether used as an anæsthetic. Longitudinal sinus laid bare to the extent of one and a half inches, by an oval opening in the skull. Copious

hemorrhage from a vein leading into sinus, which was arrested after ligation. Two catgut ligatures were placed underneath the sinus about one-half inch apart, and the vessel cut transversely between them. The bleeding was very copious, the blood escaping in jets synchronous with the heart's impulse; the flow was also distinctly increased and diminished by the respiratory movements of the chest. During inspiration the stream was diminished, while expiration was always attended by a decided increase in the force of the jet, and the amount of bleeding. No air was seen to enter, although the hemorrhage had been very profuse and continuous for a considerable length of time. As it was intended by this experiment to prove that sudden obliteration of the longitudinal sinus is not incompatible with life, the distal ligation was tied, with the effect of nearly, but not completely, arresting the hemorrhage, as some blood escaped from the proximal end of the vessel. It was now intended that air would be more prone to enter through the gaping wound in the sinus, as the blood pressure from the distal end of the vessel had been arrested by the ligation, but as this accident did not take place after a few minutes, the second ligation was tied, and the wound in the skin united with a continued catgut suture, and the antiseptic compress applied. The animal showed no other symptoms except great prostration from the sudden and profuse loss of blood. After an hour it rallied, and apparently was in full possession of all its special senses, and was able to walk about as usual. The next day it manifested a ravenous appetite, and, during the whole time it was kept under observation, it showed no signs of illness or discomfort. The wound united by primary union, the skull showing the oblong bony defect at the site of the operation, through which the pulsations of the brain could be distinctly seen and felt. Unfortunately, the animal ran away after complete recovery had taken place, and deprived me of the opportunity to study by post-mortem examination the local effect on the intra-cranial circulation by the operation. This experiment tends to prove that ligation of the longitudinal sinus can be performed without seriously compromising the functions of the brain, and that in certain well defined instances this procedure might be resorted to in practice with a view of preventing hemorrhage from, and entrance of air into, this vessel, in intentional and accidental wounds of the sinus.

Experiment No. 2.—Small tan cur; weight 10 pounds. Partial ether anæsthesia. Longitudinal sinus opened by two transverse incisions in close proximity; hemorrhage alarming, at first in jets, and, as the bleeding diminished, in a more continuous flow. At first the blood was bright red, but as respiration became impaired, it grew

darker in color. Dilating forceps were introduced into the proximal wound; the hemorrhage continued, but no air entered as long as the animal was in a lying position, but as the respiration became more irregular and superficial, artificial respiration was resorted to, and the head placed in an elevated position, whereupon the heart suddenly ceased to pulsate, and upon applying the ear to the præcordial region, a few irregular and very feeble contractions were heard, attended by a distinct churning sound, when the animal suddenly expired. Before death electricity was used with the effect of improving the respirations, but it had no effect whatever upon the action of the heart. Death took place about three-quarters of an hour after the sinus was opened. At the examination, immediately after death, all the tissues and organs were found in an exsanguinated condition. All the vessels leading to and from the heart were carefully tied, and the organ removed. On being placed in water it floated like a cork; the right auricle and ventricle were dilated, and on being opened under water, bubbles of air and only a very slight amount of spumous blood escaped. The pulmonary artery was also distended with air. The left ventricle was almost completely empty. In this instance the animal almost bled to death from the wounds in the longitudinal sinus, and yet no air entered, although the wound was kept patent with a pair of forceps. The entrance of air was caused by the elevation of the head and the forcible movements of the chest during the performance of artificial respiration. To judge from the amount of air found in the right side of the heart and its effects, the air must have entered quickly, and in considerable quantity, distending at once the right side of the heart in the diastole, after a few feeble attempts to force it from the right chambers. I believe, if the animal had been left in the lying position, and the head dependent, that death would have taken place from hemorrhage, as the blood which was draining through the sinus prevented the entrance of air, but as soon as the head was raised, the contents of the sinus by gravitation flowed towards the heart, and air entered with it to fill the vacuum which was being prepared by the diminished blood supply to the brain, and the acceleration of venous return, as well as the increased aspiration of the chest, which was brought about by the attempts at artificial respiration.

Experiment No. 3.—Horse about twelve years old. Partial chloroform anæsthesia. Animal kept lying on the ground, head even with the body. Longitudinal sinus exposed for about two inches and incised longitudinally one inch. Hemorrhage very profuse; blood at first bright red, gradually growing darker in color; double waves well marked. After about three quarts of blood had been lost, and the

hemorrhage still continuing at the same rate, and not being readily controlled by the ordinary compression, it was decided to implant an aseptic sponge into the sinus. This was done, and the external wound united over it by the continuous suture. No air was seen to enter the wound, and auscultation over the heart revealed no abnormal sounds. During the operation of chiseling, the apices of the frontal sinuses were opened, which led to the fear that infection of the wound would subsequently take place from this source. This expectation was realized. The animal rallied soon after the operation, and appeared to be quite well for three days subsequently, grazing in the pasture with other horses. On the morning of the fourth day it was found dead. Examination of the cadaver showed that the proximal end of the sinus was closed by a thrombus firmly adherent to the walls of the vessels and the implanted sponge, but about the distal end of the sponge, at a point which corresponded to the opening in the frontal sinuses, the brain and meninges showed all the appearances of acute septic inflammation. If infection had not taken place, the aseptic sponge would have fulfilled all the purposes for which it was intended—arrest of hemorrhage and obliteration of the sinus. It seems to me that in cases of uncontrollable hemorrhage from accessible sinuses, the implantation of an aseptic sponge would prove a safe and efficient measure against hemorrhage, and would offer no obstacle against obtaining primary union and definite closure of the vessel, as during the process of granulation the sponge disappears by absorption.

Experiment No. 4.—Horse 14 years old, in good condition. This experiment was made for the purpose of confirming the suspicions already gained that the force of gravitation constitutes the most important factor in determining the admission of air into an open sinus of the dura mater; consequently no anæsthetic was given, but the animal was firmly held by a bit, and the operation was performed without any difficulty while the animal was in a standing position with the head elevated. With the trephine and chisel an oval opening of about two and one-half inches in extent was made over the longitudinal sinus. After all oozing had ceased, and the sinus being fully in view, its anterior wall was divided completely in a transverse direction. The edges of the wound immediately retracted, forming a diamond-shaped opening, through which blood escaped in moderate force, but not nearly as copiously as on previous occasions, when the animals were in the lying position. During the first inspiration after incision, air entered with a loud gurgling or lapping sound, and on applying the ear over the apex of the heart, a loud churning sound was heard synchronous with the movements of the heart. During expiration air-

bubbles were seen to escape from the proximal end of the sinus. As soon as the head was lowered the hemorrhage greatly increased, but air never entered in this position; but as soon as the head was elevated, hemorrhage either ceased entirely, or was at least greatly diminished, but air was sure to enter during inspiration. These manœuvres were repeated a number of times, and always with the same results. As the amount of air which was aspirated increased, the respirations became more labored, and signs of cyanosis became apparent. An attempt was made to close the wound in the sinus by sutures, and in this way arrest the hemorrhage. Three cat-gut sutures were passed through both edges of the wound, but on attempting to approximate its margins, every one of them tore through the tissues before the parts were in apposition, proving conclusively that transverse wounds of the longitudinal sinus cannot be sutured, owing to the unyielding nature of the tissues. The external wound was completely closed by the continuous suture, and a firm, graduated antiseptic compress controlled the bleeding. During the whole time of the operation, which lasted over an hour, some one of the bystanders listened to the heart's action, and the loud splashing or churning sounds were constantly heard. When the animal was released it commenced grazing in the pasture, and appeared as well as before the operation. The heart was examined at intervals of thirty minutes, and the abnormal sounds grew more feeble, and after an hour had entirely disappeared. The sound produced by the entering air, I have described as lapping, resembling very much the sound produced by the lapping of a dog or cat; the best possible word for this sound is the German expression, "schluerfend." When air enters through a wound of the longitudinal sinus this sound is characteristic, and is always the same, and, in case the animal operated upon is a horse, it is sufficiently loud to be heard at some distance. Experiments have shown that horses are most tolerant to the presence of air in veins, on account of the unusual development of the right ventricle, which has sufficient power to force the air through the pulmonary circulation, and this experiment would certainly tend to corroborate this observation, as air in large quantities was aspirated at least a dozen times during the operation, and that most of it entered the right side of the heart and was not returned, is evident, from the persistence of the sounds due to the presence of air for a period of two hours, and yet, aside from a certain degree of embarrassment of respiration, the animal suffered no inconvenience. The wound healed by primary union. The defect in the skull remained permanent. The animal was killed about four weeks afterwards. Post-mortem appearances: The trephine opening filled with cicatricial tissue.

Proximal end of sinus just behind trephine opening contains one large granulation thrombus. Cicatricial tissue filling almost the entire lumen of the sinus. Anteriorly the sinus is somewhat contracted and smooth; no thrombus here, or evidences of proliferation. The circulation is apparently restored by the formation of a new channel, or dilatation of a pre-existing one. This new sinus is located to the left of the median line. The lateral sinuses are very much enlarged.

Experiment No. 5.—Young yellow dog, weight about 15 pounds. Partial ether anæsthesia. Longitudinal sinus exposed and transversely incised at two points in close proximity. Hemorrhage profuse; was allowed to continue for over half an hour, in order to estimate the length of time which would be necessary for death to occur from this cause uncomplicated by admission of air. When the animal appeared moribund, both ends of the sinus were ligated. The heart's action was very feeble and irregular. Death occurred in 35 minutes. At the examination after death, no air was found in the vessels or heart, and death was plainly attributable, in the absence of any other cause, solely to the loss of blood.

Experiment No. 6.—Newfoundland dog; weight 50 pounds. Partial ether narcosis. During the removal of bone over the sinus severe hemorrhage was encountered from the large venous channels in the diplœ. The great irregularity of the external surface of the skull led to a mistake, as the frontal sinuses were again opened. The longitudinal sinus was laid open by an incision half an inch in length, in a parallel direction to the vessel. Hemorrhage very profuse for half an hour, checked at times by compression, when it finally diminished, and the wound was closed. After the operation the animal walked with a staggering gait, and would run against objects indiscriminately, showing that sight was greatly impaired, inasmuch as the animal had fully recovered from the effects of the ether. No air was seen or heard to enter the sinus. Heart sounds feeble, but otherwise normal. Death in this case took place a week after the operation, from lepto-meningitis. The source of infection undoubtedly was again traceable to injury of the frontal sinus, as the earliest evidences of the disease were found nearest to the opening in this structure.

Experiment No. 7.—Old decrepit horse. Operation was performed while the animal was in the erect position. On removing disc with trephine, a longitudinal wound, one-half inch in length, was found in the anterior wall of the sinus, through which bright red blood escaped. Double pulsation well marked. Almost immediately after the removal of the disc of bone, and before more than an ounce of blood escaped, air entered with a loud and distinct lapping sound, audible to all who

were present. On applying the ear over the heart, the same loud churning sounds were heard. As the head was lowered, the flow of blood became more forcible and copious, but no air entered. As soon, however, as the head was elevated, bleeding diminished, and air entered during almost every inspiration. Respiration became labored, and after air had entered four or five times in succession, the animal fell to the ground. In this position no further entrance of air occurred, but the hemorrhage continued copiously, the blood flowing in a continuous stream, with a well marked double jet, synchronous with the action of the heart, and the respiratory movements of the chest. The opening in the skull was enlarged to two inches in length and one and one-half inches in width, so as to expose the sinus freely. A number of catgut sutures were now introduced through both lips of the wound, and, on attempting to tie them, great difficulty was experienced in approximating its margins, which could be brought nearly, but not completely, in contact without the sutures tearing through. The tying of all the sutures resulted in diminishing, but not arresting the bleeding, showing conclusively that in longitudinal wounds of the sinus suturing is an imperfect and unreliable measure in arresting hemorrhage, to say nothing of the difficulty which is experienced in passing the sutures at such great depths and in the limited space furnished by the artificial opening in the skull. The wound was not closed, but tamponed with iodoform cotton, in order to observe from time to time the processes which nature would initiate in the restoration of the wounded sinus. Half an hour after the first entrance of air, the churning sounds in the heart had much diminished, and they almost completely disappeared after the lapse of one hour. The animal recovered completely from the immediate effects of the air-embolism, the respiration having again become normal in frequency and character. After two hours the tampon was removed, but bleeding again occurred, and it was replaced. The animal died 24 hours after the operation, probably from the combined effects of the loss of blood, hemorrhage into the subdural spaces, air-embolism and senile marasmus. At the examination of the cadaver, a subdural clot was found on the right side of the brain, which weighed about half an ounce; on the left side of the sinus, a second but smaller subdural clot was found. Trephine opening filled by a coagulum. One of the sutures had lost its hold by tearing through the tissues of one margin of the wound. Within the sinus a small fragile clot was found, also a small wound in the lateral wall of the sinus, which served as the source of hemorrhage into the subdural space. This experiment illustrates well the danger of plugging the opening in the skull for the purpose of arresting hemorrhage in case the lateral walls of the sinus

are injured, as it will almost necessarily lead to subdural hemorrhage, and expose the patient to all the disastrous consequences incident to this occurrence. In this instance sponge implantation would not only have more successfully guarded against external bleeding, but also would have served as a sure prophylactic against extravasation into the subdural space. It also teaches that suturing, in cases of wounds of the longitudinal sinus, with limited defects in the bony walls of the cranium, is impracticable, unreliable and unsafe, and should never be resorted to, unless the dura mater is so extensively exposed or separated as to permit, by making gentle traction, perfect and complete approximation of the margins of the wound.

VII. PRACTICAL SUGGESTIONS.

In order to study the conditions which favor the aspiration of air into a wounded sinus of the brain, it is necessary to call attention to some of the peculiarities of the intra-cranial circulation. Mosso (*Ueber den Kreislauf des Blutes im menschlichen Gehirn*, 1881), who has made this a special subject of investigation, asserts that the intra-vascular pressure in the veins within the cranium is higher than in the veins of any other part of the body. Actual measurements have shown that the blood pressure in the longitudinal sinus is equal to 100-110 mm. Hg. The probable cause of this phenomenon is, that the force of distension of the arteries within the closed and unyielding cranial cavity is added to the *vis a tergo*. The intra-cranial veins show distinct pulsations, which are dependent upon the pulsations of the arteries, and their movements are so plain that they can be graphically demonstrated; every diastolic movement in the artery corresponds to a venous pulse. During the pulsations of the brain, Mosso claims, with Donders and Berlin, that the cerebro-spinal fluid does not escape into the spinal canal. In a case of spina bifida, he has been able to trace respiratory, but no circulatory movements. When the tumor was compressed, only a very slight increase in the volume of the brain could be detected at the fontanelle, even if nearly the whole contents of the tumor were pressed into the spinal canal. G. Burkhart (*London Lancet*, October 15, 1881) has published the results of his observations on the movements of the brain, which he made on four patients who

had suffered partial loss of the cranial vault. The tracings obtained represented three forms of movements,—pulsatile, respiratory and vascular. The cerebral pulsation has the form of a tricrotic or tetracrotic pulse, the phases following one another in about the same time as those of the carotid pulse. His observations led him to the conclusion that the brain presents the same movements within the intact skull, as in the infant, or when a defect in the skull exists, the result of traumatism. The brain expansion is synchronous with the dilatation of the vessels, and takes place in the direction of the vascular ramifications. The resistance is in inverse proportion to this expansion. In the closed skull the excess of pressure in the arteries aids materially the propulsion of the blood through the veins, and also that of the sero-lymphatic fluid. In the open skull the curve rises during expiration and falls during inspiration. All actions which increase the respiratory movements, increase the height of the curve. A secondary elevation follows labored inspiratory movements, but the pulse waves are never completely effaced. The vascular curves occur independently of respiration or pulsation. The height of the curves bears no constant relation to their length. They are notably influenced by psychical influences. They are produced by movements of the vessels by means of the vaso-motor nerves, and can be made very conspicuous by irritation of the cervical sympathetic. Bergmann (*Verhandlungen d. deutschen Gesellschaft f. Chirurgie*, Vol. X., p. 14), in his remarks on the movements of the brain (in opposition to Mosso), at the meeting of the Congress of German Surgeons, in 1881, insists that the cerebro-spinal fluid acts as a regulator in maintaining the equilibrium between the arterial and venous circulation within the cranium. The pulsations of the sinuses of the dura mater were discovered and studied under his supervision at Dorpat as early as 1873. He argues that these pulsations are very slight, and on that account, insufficient to counterbalance the arterial pulsations. He explains the pulsations of the sinuses in the same way as Donders and Jacobi have accounted for the pulsations in the veins of the papilla of the optic nerve. The pulsations are the result of increased tension in the cerebro-spinal fluid during the arterial systole

and the consecutive diminution of intra-cranial pressure during the arterial diastole. The cranium being a closed cavity, with unyielding walls, it is not difficult to understand that in case one of the sinuses is opened by a wound which communicates with the atmospheric air, the sudden loss of blood will have a tendency to create a vacuum which is filled by the admission of air which reached the left side of the heart with the venous blood.

All circumstances which diminish intra-vascular and intra-cranial pressure must of necessity favor the occurrence of aspiration of air into a wounded sinus. It is evident that aspiration of air into an open wound of the longitudinal or any other sinus of the dura mater, is favored by the following conditions: 1. The force of gravitation. 2. The inspiratory movements of the chest. 3. The condition of the arterial circulation. In considering the prophylactic treatment against the admission of air during operations which involve any of the cerebral sinuses, it is of the greatest importance to keep the head at a level with the heart, to insure regular respiration, and to guard against undue or forcible inspiration, and, finally, to maintain the normal activity of the ventricular contractions. The direct preventive measures consists in :

1. Continuous irrigation of the field of operation.
2. Prophylactic ligation of the sinus.

In resorting to constant irrigation, the fluid used should be an aseptic solution at the temperature of the body, which, if it should enter the venous circulation to fill an empty space, would do no harm either as a toxic agent or by causing coagulation of the blood. A solution of salicylic acid in distilled water, or borated water would be best adapted for this purpose. In extirpating tumors of the dura mater in the region of the longitudinal sinus, where wounding of this structure becomes a necessity, it would not only be prudent, but good practice, to ligate the sinus on each side before attempting the removal of the tumor, as this precaution would surely and effectually prevent the two most dangerous and alarming accidents,—hemorrhage and aspiration of air. This plan was followed by Kuester in removing a sarcoma of the dura mater, in 1881. (*Berl. Klin. Wochenschrift*, 1881, p. 673.) **Experi-**

ments on animals and the cadaver have convinced me that this operation can be performed with comparative ease, if the defect in the skull is sufficient in extent to permit the necessary manipulations, and, in the event this operation be done for the purpose of facilitating the removal of tumors of the dura mater, this precaution should never be neglected. With a tenaculum the dura mater is seized and drawn forward at the outer border of the longitudinal sinus, and a small incision parallel with the border of the sinus should be made with a tenotome, the incision being only sufficiently deep to divide the dura mater. After making such incisions on each side of the sinus directly opposite each other, the sinus should be grasped with a sharp-toothed spring forceps and drawn forward, when a small, curved, sharp-pointed aneurism needle is passed into one of the openings, and, after penetrating the falx cerebri underneath the vessel, is brought out through the opening on the opposite side. When both of the ligatures are in place, the peripheral ligature is tied first, and after emptying the intervening part of the vessel of its contents, the proximal ligature is also tied. If both of the ligatures have been properly applied, the intervening portion of the sinus can be opened or excised with the tumor without risk of hemorrhage, or the introduction of air; at the same time it will greatly facilitate thoroughness in the removal of diseased tissue. I am firmly convinced that the preliminary ligation of the longitudinal sinus will become an established procedure in all cases where tumors of the dura mater are so situated that their removal implicates this structure, and that it will render possible the removal of tumors which, without it, would place in great and immediate jeopardy the life of the patient by hemorrhage or the admission of air. The process of circulation in the sinus is the same as in the veins, and is accomplished in the same brief period of time. In accidental wounds of the sinus, ligation should be resorted to whenever the original defect in the skull is sufficient to permit the necessary manipulations, or when simpler methods have failed to accomplish the same object. Implantation of an aseptic sponge into a wounded sinus should be resorted to in all cases of wounds of the lateral walls of the sinus in cases of accidental wounds

where ligation is impossible and where other measures have failed to arrest the hemorrhage. The sponge should be large enough to make gentle pressure upon the inner surfaces of the sinus, and yet sufficiently firm to arrest the circulation in the vessel, so as to prevent the escape of blood into the subdural space. The hæmostatic action of the aseptic tampon is made more efficient by adding external compression, applied in the form of a graduated aseptic tampon. If the wound remains aseptic, the sponge forms a nucleus for the thrombus, and is infiltrated by connective tissue cells from the intima and adjacent tissues, and is gradually removed by absorption as the definitive obliteration of the vessel proceeds. Small wounds of the sinus can be readily and safely closed with the lateral ligature applied in the same manner as in similar wounds of the veins.

In recapitulation, we are warranted in stating the following conclusions:

1. Elevation of the head is the direct and most essential cause in the production of air embolism through a wound of the superior longitudinal sinus.
2. Suturing of a wound of the superior longitudinal sinus as a hæmostatic procedure is unreliable, and in most instances anatomically impossible.
3. Prophylactic ligation of the superior longitudinal sinus should be resorted to in all cases where this vessel is involved in extirpating tumors of the dura mater.
4. Implantation of an aseptic sponge into a wounded longitudinal sinus will arrest hemorrhage without interfering with the definitive obliteration of the vessel, and deserves a trial in cases where the lateral walls of the sinus have suffered injury, and where ligation is impracticable.

[To be Continued.]

SPONGE-GRAFTING.

By J. BURNETT, M.D.,

OF CARBONDALE, PA.

SINCE Dr. Hamilton, of Edinburgh, devised and described a method of sponge-grafting, with a series of illustrative cases, a number of tentative applications of his procedure have been made by various observers. I have succeeded in collecting a sufficient number of reported experiments to indicate with some exactness its possible uses and limitations. These experiments it is my intention to briefly summarize, adding a hitherto unreported case occurring in my own experience.

Of Hamilton's experiments, five in number, four were successful, the fifth failed. His first case was that of an ulcerated wound on the outside of the left leg, a circular excavation, five inches in diameter and one-half to three-quarters of an inch in depth. The usual methods of treatment having failed, it was grafted with sponge on August 3d, 1880. "On January 5th, 1881, the sponge had entirely disappeared, and there was merely a typically healthy granulating surface measuring about one and one-half inches in diameter. In the healing of this wound it seemed that instead of the edges and surrounding skin being drawn downwards and towards the center, as in the usual process of cicatrization, the reparative material had in reality grown up within the interstices of the sponge, and so had filled in the vacuity caused by the cellular tissue slough. It seemed to be, in every sense of the term, a process of healing up, instead of contracting down."

In his second case, a piece of sponge was employed as a compress in a wound resulting from the excision of an epitheliomatous tumor in the neighborhood of the lower jaw, and having remained a few days, became adherent. The superficial portion was clipped off, and the remaining portion left in situ. The patient at this stage was dismissed and passed from under observation. The third case was under Mr. Bell's direction,

consisting of an intractable ulcerated wound of long standing on the left leg, with much cicatricial contraction of surrounding parts. After failure of the usual expedients for procuring repair, amputation was contemplated, but on January 8th, 1881, the wound, measuring two and one-half by two inches, was grafted with sponge. In time the sponge was completely organized and the wound healed over.

The fourth experiment was in the case of a woman from whom Mr. Bell removed a large recurrent cancer of the mamma with some axillary glands, and a large portion of integument, leaving a gap of considerable size, which was filled with sponge. The operation was performed on February 3d, 1881. By the 13th it was vascular, and in the early part of July it had entirely disappeared, leaving a very small granulating surface partially covered with epithelium. The fifth experiment failed. The case was one of old necrosis of the tibia, communicating with a large sloughy wound in which the apparently dead extremity of the bone was visible. Sponge-grafting was attempted and failed on account of the absence of underlying blood-vessels to penetrate into its interstices. Dr. Norman Porritt has reported a case.¹ A pale granulating cavity, the result of a traumatism, four inches long, two inches in breadth, and one-third of an inch in depth, existed on the right cheek. On November 21, 1881, it was grafted with sponge. January 13, 1882, "patient dismissed. The wound is now three-fourths of an inch long, and one-fourth of an inch broad, and is healthy and granulating. Cicatrization is proceeding very rapidly indeed."

Dr. T. Sanctuary has detailed three cases of sponge-grafting.² One was a sloughing wound of the urethra, its superficies being rather larger than a sixpence. Five pieces of sponge packed into the wound produced prompt granulation and healing without contraction. The second was one in which the side of a terminal phalanx was shaved off, leaving a clean cut wound. It was grafted, and the finger was sound at the end of three weeks. In the third case there was a removal of part of the terminal phalanx, with extensive destruction of skin, and

¹ *The Edinburgh Medical Journal*, May, 1882.

² *British Medical Journal*, December 16, 1882.

consequent slow healing. It was grafted, and healed completely in eight weeks.

Dr. James Ferguson¹ has practiced a modified sponge-grafting in the case of an ulcer of three years' standing, of traumatic origin. The sore extended almost around the calf, measuring from two to five inches in width, its surface sloughy and of offensive odor. Its level was, for the greater part, almost that of the body surface, except at one angle where a deeply scooped-out depression existed. The excavated portion was sponge-grafted, and healed very slowly, but completely. The more elevated portions were grafted with skin, and excepting an area overlying bone, also healed. A space of an inch in diameter over the tibia sloughed off, leaving an ulcer one-quarter of an inch in depth, with a white, fibrous, non-vascular floor. This secondary ulcer was sponge-grafted, and after a few days the sponge was torn away, leaving a completely changed, vascular, bleeding level reaching well up toward the body-surface. Granulation proceeded rapidly and skin-grafts soon produced cicatrization. Another case is detailed in the same paper, of an ulcer, in which, after sponge-grafting, erysipelas (the patient being subject to idiopathic attacks) set in, and it was judged advisable to remove the sponge. Rapid granulation and healing followed as in the previous case. Ferguson judges that, whether the erysipelas or the sponge was the active agent, the latter was certainly a factor, and deserves future employment. He recommends temporary sponge-grafting for the purpose of stimulating tissue-growth and granulations. Hamilton's statement that the sponge-graft is destitute of nerve-tissue, he cannot sustain, pain being caused in his cases by pricking or cutting the graft after adhesion and vascularization had taken place.

Mr. de Lantour² reports a case of operation for cicatricial contractions of the hand, resulting from a burn, in which he filled the resulting gaps with sponge, and secured healing with very slight or no recontraction.

Dr. Royal Whitman³ reports four cases in the service of Drs.

¹ Ibid.

² *Australian Medical Journal*, April 15, 1883.

³ *New York Medical Record*, October 7, 1882.

W. H. Thorndyke and C. D. Homans, at the Boston City Hospital. In the first case a suppurating and sloughing bubo existed in each groin above and below Poupart's ligament. The entire extent of Scarpa's triangle on the right side was exposed, showing the saphenous veins and the sheath of the femoral vessels. These surfaces soon began to granulate and were then sponge-grafted on March 13, 1882. By June 27, 1882, the sponge was absorbed, and only a small granulating surface, three-fourths of an inch in diameter, existed. The patient was then discharged. The second case was one having ulcers of long standing. Sponge-grafts were applied, and had reached the stage of complete vascularization, when they were torn out by the patient. The ulcers relapsed into their original condition. The third experiment consisted in the use of a sponge thrust into the medullary cavity of the femur, to control hemorrhage from it, during an amputation of the thigh. The sponge was left in the bone, and union of the entire wound took place by first intention, and all dressings were discontinued on the twentieth day. In the remaining case, sponge-grafts were used after an extensive amputation of the breast, but the wound healed slowly and the process of repair seemed to be retarded by the presence of the sponge.

Dr. W. G. Thompson¹ reports the successful grafting with sponge, of a large ulcer. I have already reported my first case of sponge-grafting,² in which six sinuses existed in the right side as the result of an abscess at the junction of the tenth, eleventh and twelfth ribs, and their cartilages. On account of the difficulty of accurately fitting the sponge to long narrow cavities, repeated trials had to be made, but finally all the cavities were healed, either by absorption and organization of the sponge, or by the stimulating action of the latter in exciting new tissue-growth.

My second case of sponge-grafting was done in Carbondale, Pa., in 1883 :

James K——, a boy 12 years old, employed as mule-driver in a coal mine of the Delaware & Hudson Canal Co., was injured by being knocked

¹ *New York Medical Record*, May 26, 1883.

² *New York Medical Record*, October 28, 1882.

down and run over by a trip of mine cars on Jan. 4th, 1883. I found, on examination, that along with a number of slight cuts and severe bruises, he, in some way which I could not explain, received an injury above the right ear, which tore away the scalp and periosteum for an area of $2\frac{1}{2}$ inches by $1\frac{1}{4}$ inches, and left the bone completely bare. No part of these tissues were adherent, they were torn off and lost.* I cleansed the wound and applied cotton wool saturated with carbolized oil. Forty-eight hours after the injury, after thoroughly cleansing the parts, I applied carbolized sponge, carefully prepared as directed by Dr. Hamilton, and fitted accurately to the wound. The sponge was about one-fifth of an inch in thickness, and was all in one piece, and the outside, or periphery of the sponge was applied to the bone. A carbolized compress was applied and fastened by a few turns of bandage. The wound was cleansed daily, but there was very little discharge, and on the fourth day the sponge had adhered to the upper edge of the wound. The progress which the graft made gave promise of a speedily successful issue in the case. The union of the edges all around the wound was complete on the tenth day, and very little suppuration had occurred. From this time until the fifteenth day the discharge increased in quantity and offensiveness. On the fifteenth day it was observed that the sponge bulged outward at the center, and upon investigation it was discovered that the edges only of the sponge adhered; the part in contact with the bone not having united at any point. The sponge was then removed and a small quantity of offensive pus was found in the wound cavity. Again the wound was cleansed antiseptically and the bone surface examined. A number of small red points upon its surface showed that action, though feeble, had been excited by the graft. Another piece of sponge was at once fitted to the wound and cleansed and watched daily. On the fourth day the greater part of the sponge had adhered at the edges of the cavity as before; some discharge began to ooze through the meshes of the sponge at first, not at all offensive, but after a week its character changed; it was thin, and gave off a disagreeable odor. This was probably in a measure attributable to the loose condition and scrofulous habit of the patient. Especial efforts were made to improve the nutrition of the boy, good food was provided in abundance, which, however, was not always well prepared, and syrup of the iodide of iron with cod-liver oil were given. He was, also, kept in the open air as much as possible at that season of the year, as his quarters at home were anything but salubrious. On the twenty-sixth day after the application of the last graft, it was noticed that the sponge was foul smelling and breaking down in the center, the edges closely adhering

and granulating. With scissors and dressing forceps the central portion of the sponge was removed; it was a broken-down, pulpy mass, infiltrated with foul-smelling pus. It was deemed advisable to remove all the sponge, which was done, except a narrow band all around the cavity where granulations had penetrated its meshes. The sponge was trimmed off carefully all around until a vascular bleeding surface was reached. Measurement showed that the wound had been slightly narrowed by the band of granulation tissue all around its periphery. The wound was again cleansed thoroughly. Now the bone surface showed marked evidence of action; its surface was thickly studded with granulations; there was no exfoliation. Another piece of prepared sponge was fitted into the wound, and a piece of oiled silk and carbolized compress applied and fastened with a bandage. The edges of this last graft did not unite as rapidly as the former ones: there was no decided adhesion of the sponge until the 11th day, and then the process was much slower than on former occasions. A free discharge of pus came from the sponge and was washed away thoroughly three times daily with a solution of bichloride of mercury (1 to 2000). From this time on, union took place steadily, and on the twentieth day firm adhesion of the sponge to the bone as well as the edges of the cavity was obtained. The discharge gradually grew less, and on the 31st day from the application of the graft granulations were seen springing up through the sponge. The process of healing was uninterrupted afterwards, and in three months the sponge was entirely lost, and its place filled with granulation tissue, over which a film of new skin had formed, and which, in another month, was firm and smooth, but looked like a cicatrix. There was no further trouble with the case.

This case presented a great many points of disadvantage. The boy was scrofulous, poorly nourished, wretchedly clad and housed, and the accident occurred at a time of the year when he could be out doors only a small portion of the time. The complete loss of tissue for so considerable an area would have been a serious matter without the exposure of bone, which materially complicated the case. Under the most favorable conditions the injury was a serious one, and could hardly be expected to heal without exfoliation of bone, skin-grafting, etc., always a tedious process. This true, a long time was taken to heal the wound, but it was much less than usual in the healing of such wounds under similar conditions.

The above enumerated cases seem to prove that sponge-

grafting is a valuable means of healing a certain class of wounds. Dr. Hamilton and others have shown its utility in healing old ulcers which had resisted all other methods of treatment. Dr. Sanctuary's second case shows that the sponge can be used on a fresh wound; Dr. Lantour's case demonstrates its usefulness in filling up gaps made by the cutting and stretching of the cicatrized contraction resulting from burns. The third case reported by Dr. Williams, shows how innocuous aseptic sponge is when completely covered in the tissues. In this case Dr. Homans, after amputating a thigh, was obliged to plug the medullary cavity of the femur to arrest hemorrhage, but although the sponge remained and the patient's condition was bad, having suffered from necrosis and exhausting suppuration, "There was almost complete union by first intention, and the patient was up on the fourteenth day, and all dressings were omitted on the twentieth day." Dr. Whitman's fourth case, although unsuccessful, does not weigh against the use of sponge-grafts, as the results, after excision of cancer of the breast with diseased axillary glands, are uncertain, under all methods of treating the wound.

My own cases prove to me the utility of sponge-grafts when it certainly would have been difficult to obtain as satisfactory results by any other means; indeed, I doubt if any other known method would have effected a cure in my first case. All means which I and my consultants could suggest were used to arrest the disease, and the patient steadily grew worse, until he was reduced almost to a skeleton. He was irritable, restless, and nearly bereft of reason. Without a change in the wounds he certainly could not long have survived. Improvement began in his condition as soon as the healing process began, and continued steadily but slowly until he had regained his average of health, which, by the way, was never very high. The healing of the shallow ulcer in this case by the sponge, although it was thrown off, confirms the view of Dr. Ferguson, viz: that sponge may be used with advantage temporarily to excite granulation in indolent ulcers. For after applying it to an indolent ulcer for six days, and then removing it, he says of the ulcer: "What had been the type of indolence and obstinacy among such sores was now the picture of healthy action—the

surface abundantly vascular and standing up towards the level of the skin. The simplest dressings were now sufficient to promote repair; and in three weeks from the employment of the sponge recovery was complete."

This case of Dr. Ferguson is, in a measure, contradicted by the second case of Dr. Whitman, for after the graft was doing well and uniting with the tissue, the patient tore out the sponge, and the healing process did not proceed farther.

My second case was, so far as I can learn, the only one in which sponge-grafts were applied on a bone surface to stimulate granulation, and although it failed twice, and was removed, the final result was all that could be desired. It would seem to offer a ready means of stimulating granulation in bone as well as in the softer tissues.

The number of cases here reported proves the undoubted utility of this method of treating indolent and intractable ulcers, wounds where there is loss of tissue, gaping wounds made by cutting and stretching the tissues (as in the cicatrices following burns), sinuses which can be accurately filled with sponge, and finally for stimulating granulations on bone. What other cases will be benefited by sponge-grafting the ingenuity of surgeons and their confidence in this means of treatment can alone determine.

Dr. Hamilton made careful microscopic examinations in his cases, which show the sponge at different stages of its organization with the tissues. He believes the process of organization is similar to that which takes place in blood clot. He also believes that no nerves are formed in the granulation tissue built up by the sponge. I do not deny that the cicatrix formed by a sponge graft is *poorly supplied by nerves*; but I think that the supply is as good as in ordinary cicatrices, the only difference being that by the use of sponge we get more cicatricial tissue—more new growth than by other means, and cicatricial tissue *per se* never has normal nerve supply.

My views as to the manner in which sponge-grafts heal wounds and ulcers were stated as follows (see *Medical Record*, October 18, 1882): Pressure has long been recognized as an important factor in the healing of indolent wounds and ulcers, and my observations in the foregoing case lead me to con-

clude that pressure—moderate elastic pressure with a pure animal porous substance, is the first essential in healing an indolent ulcer. Pressure with the sponge in the long, narrow sinuses of my patient had the same effect upon the walls of the cavities that Mr. Callender's hyperdistension of abscess has—both stimulate healthy granulation, the difference being that in the latter case a liquid is used which distends temporarily, and is then removed; in the former a semi-solid substance is allowed to remain and exert moderate equable pressure, and finally to become a part of the tissue. Sponge, from its porosity, is one of the best agents to thoroughly drain wounds and prevent septic absorption. This action of sponge was noticed more than a century ago by Mr. Charles White, of Manchester, in a paper entitled: "An Account of the Successful use of Sponge in the Stoppage of Hemorrhage occasioned by Amputation below the Knee, and the Remarkable Effects of that Application in Preventing the Absorption of Matter." Mr. White concludes his paper with these words: "The sponge keeps down fleshy granulations, partly by a removal of that matter in which they would be soaked, and partly by a compression, the most easy and equal that can possibly be imagined from the natural elasticity of the sponge." (See S. Gamgee, *London Lancet*, February, 1882.)

When rendered aseptic, "sponge combines stimulation, pressure, and drainage better than any other substance with which we are acquainted, and these are the essentials in the treatment of indolent ulcers." I have nothing to add to these views of the manner in which sponge stimulates granulation—equal elastic pressure with an antiseptic material which may be allowed to remain undisturbed in the tissues, is the whole secret of the process. All that is necessary in the sponge is to have a good quality, thoroughly cleansed of all foreign matter and rendered aseptic by any of the agents used by surgeons for that purpose.

EROSION OF INTERNAL CAROTID ARTERY DURING SCARLET FEVER; HÆMORRHAGE FROM EXTERNAL AUDITORY MEATUS; LIGATION OF COMMON CAROTID; RECOVERY.

By BENNETT MAY, F.R.C.S.,

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EROSION of the internal carotid due to suppuration of the middle ear or to caries of the petrous bone, is a rare accident, and one which appears to have been uniformly fatal in its results. Politzer (Diseases of the Ear, 1883), on the authority of Hessler, states that only thirteen cases are to be found scattered throughout medical literature, in every one of which a fatal issue enabled the diagnosis of ulceration of the internal carotid artery to be confirmed by post-mortem examination. The list does not make special reference to scarlet fever as a cause of erosion, but includes most of the known forms of caries of the temporal bone, as syphilis and scrofula, etc. *

Case.—A young girl of 15 had passed the third week of a severe attack of scarlet fever without other complication than a good deal of cervical adenitis. She then began to complain of pain in the left ear, while the parotid and mastoid regions became much swollen. After some days of acute suffering pus escaped from the left meatus, to her great relief. A week afterwards her medical attendant, Mr. Reginald Bower, was summoned (Feb. 23, 1884) on account of a sudden and alarming hæmorrhage from the same ear. The blood was bright red in color, and he estimated the loss at upwards of half a pint, and the duration of the bleeding at something less than 5 minutes. It had nearly ceased to flow before his arrival, but he made the arrest complete by local pressure. The child was greatly alarmed and remained almost motionless in dread of recurrence. This took place on the 25th, sud-

denly as before, and to an equal or even greater amount, the flow again ceasing spontaneously. Between this and the 27th there were a few slight jets, and the pus was blood-tinged.

I saw her on the evening of the 27th, when her exsanguinated condition and the general history pointed to the internal carotid as the source of bleeding, and indicated the advisability of immediate ligation of the common carotid. I proceeded to perform the operation at once, but before my arrangements could be completed another hæmorrhage occurred. I had thus an opportunity of witnessing the blood spurt out in a greater gush, and of ascertaining that the flow was manifestly controlled by compression in the neck.

I completed the operation as expeditiously as possible, with the result of instantly and permanently arresting the bleeding. The ligature used was a piece of ordinary silk; it came away on the fourteenth day and the wound quickly cicatrized under ordinary dressings. On the day following the operation she was much relieved, having lost her anxious alarmed look and much of the pain, but her condition was one of extreme prostration. On the second day she suddenly lost her speech, and complete aphasia continued until the end of the third week, when she suddenly uttered the words, "mother," "Mr. Bower," in their presence. During this time her mind was quite clear, and she was able to read and write nearly as well as ever. Her convalescence proceeded satisfactorily till the sixth week, when it was interrupted by an attack of nephritis, with dropsy, from going out too soon. After a time her health became fully established and is now excellent in every respect.

Among numerous features of interest in the case I select the following for further comment: First, as to the source of bleeding. It may be considered that this still remains doubtful, and that it is still undecided whether an erosion of the internal carotid artery was really the cause, inasmuch as no post-mortem was made, but if that objection be urged, direct proof can never be obtained, and the question of a possible recovery after ligation, for this cause, must always be undecided.

I entertain no doubt myself, on this point, for the blood spurted from the ear in great gushes of bright red color with each beat of the heart, and in a quantity which no other artery in the neighborhood could furnish a fraction of.

The intermittent character of the bleeding and its frequent spontaneous arrest are features which Politzer considers char-

teristic of bleeding of this kind, and from this source, he says, that with these symptoms the diagnosis must be accepted as certain. In the thirteen cases which he submits to critical observation, the hæmorrhages varied in number from 1 to 20, the duration of each attack from 4 to 10 minutes, and the period from the commencement of the first bleeding till the fatal issue, from 5 minutes to 4 weeks. Three of the cases appear to have been treated by ligature of the common carotid, but unsuccessfully. It should be stated that in the great majority of the cases there was old standing and destructive disease of bone, and in general, there was suppuration within the skull. Consequently the conditions were not nearly so favorable for recovery, as in my patient's case. In her, suppuration of the mucous membrane of the tympanum must have led to a carious erosion of the thin plate of bone separating the cavity from the carotid canal, and opposite this point the exposed arterial wall, being bathed in pus, became so weakened that a small aperture formed in it.

Toynbee (*Med. Chir. Trans.*, vol. 43, p. 218) considered that acute inflammation of the tympanum is more likely to lead to a carious erosion of this plate of bone than a chronic disease, and he cites two cases in illustration.

The autopsy of the thirteen cases previously referred to, showed that the aperture in the artery rarely exceeded two lines in length, and that it is always situated at the bend where the vessel passes from the vertical to the horizontal direction. From this point to the final breaking up of the vessel within the skull a great length of artery intervenes, so that there is nothing to prevent the obliteration of the vessel by a ligature thrombus, if the local reparative changes in the vicinity of the eroded carotid are favourable. Such favourable changes would likely be established in an acute otitis like this, where the bone lesion is limited and superficial.

It furnished an interesting feature to observe the rapidity with which all signs of local inflammation began to abate on the application of the ligature. The parotid and cervical swellings, which had been considerable, began to shrivel at once, and only one small abscess required to be dealt with. The discharge from the ear did not materially abate for three

weeks. After that it subsided rapidly, till the fourth of the month, when it was almost at vanishing point. It has relapsed since on a few occasions, from taking cold, but for some months has quite dried up.

It appears certain that the brain symptoms did not set in at once. The girl spoke after the operation, and did not lose her speech for two days, when it suddenly left her. She uttered no word for three weeks, but understood what was said to her, and could read and write as well as ever. The movements of the right arm were more sluggish than of the left, but there did not appear to be any impairment of sensation. At the present time her memory and intellect are perfectly good. Dr. C. W. Suckling has recently investigated her condition, and reports as follows: "There is no trace of aphasia now, but the speech is a little slowed. The right side of the face is evidently in a paretic condition. There is no deflection of the tongue. The grasp of the right hand is exactly equal to that of the left, viz: forty kilogrammes. On considering the present symptoms and past history, I have no doubt that the girl has had ataxic aphasia, and the variety sometimes called aphemic (where written language is unaffected), and paralysis of the right side of the face. I attribute these symptoms to an interference with the circulation through the branches of the left middle cerebral artery supplying the third left frontal convolution and the convolution of the operculum on the left side, the latter being the centre for the face and hand. I think this was probably due to embolism or thrombosis, most probably the latter, for there was an interval of forty-eight hours after the ligature before the onset of the symptoms."

It appears certain that ligature of the main trunk is the only means of treatment which offers the slightest prospect of recovery in these cases. Compression in the neck or local pressure at the meatus is in no way to be relied upon, although the intermittent character of the bleeding and its frequent spontaneous arrest might, for a time, lead to a belief in their efficacy; nor is the usual rule of treatment of wounded arteries at the seat of injury possible of accomplishment. Of the uselessness of pressure at the meatus, I had an illustration about the same time this case came under my care. By a

curious coincidence of practice, a fortnight before I attended this girl, I was summoned to the scarlet fever wards of the Borough Infectious Hospital, to see a child in an advanced stage of the disease, in whom some severe hemorrhage from the auditory meatus had taken place. There had been profuse suppuration from the ear for some time, and the child appeared to be hopelessly ill with abscess of the neck and bone caries. I made arrangements to ligature the common carotid, if the bleeding, which had ceased for some time, recurred, giving instructions to the attendant in that event to plug the meatus pending my arrival. This was done, and the consequence was that a great gush of blood came from the mouth and nose, of which the child died. Here, the blood, finding its ready outlet barred, made its way down the Eustachian tube, as perhaps ought to have been foretold. I don't think she could have got well under any circumstances, but the lesson of the case, I was, fortunately, very shortly afterwards, enabled to put to practical account. It is mentioned by Politzer only to be condemned, along with such measures as astringent injections and application of cold, etc. He entertains no hope of success from anything but ligature of the common carotid, and expresses the conviction that, though hitherto uniformly unsuccessful, the possibility of a successful issue is not precluded in future operations.

INDEX OF SURGICAL PROGRESS.

General Surgery.

I. TUBERCULOUS TENDOVAGINITIS. By Dr. A. BEGER (of Hamburg). Tuberculous disease of the sheaths of tendons being the subject of very few publications in Germany (the greater part having been made by French authors), and the surgical text-books containing but scanty information on the subject, the author publishes four cases, observed by him in the Leipsic university clinic as assistant to Prof. Thiersch.

The first is that of a laborer, 45 years of age, who presented a tumor, 6 centimetres in diameter and 2 cm. in height, just above the wrist on the inside of the forearm, and situated beneath the superficial tendons and under the ulnar artery, adhering neither to the bones nor to the skin. There was a slight swelling in the palm of the hand, but none on the dorsal aspect. It had commenced five years before, in the same place, as a soft tumor, and had considerably impaired the power of his movements; three years later the fingers had become flexed; for nine months he had been unable to work. He had been "scrofulous" in his youth; his family, however, was quite healthy. The tumor had been once punctured. On 6th May, 1881, a longitudinal incision was made, disclosing tuberculous growths about the tendons, and continuing down to the palm, where another incision was made. The masses were scraped out, and antiseptic dressings applied. A free purulent, inodorous discharge subsequently set in; the patient's strength failed, and a number of abscesses formed. June 25th, the arm was amputated at the middle of the humerus, the wound healing by first intention, and a month later the patient was dismissed in good health.

The tendons were found enveloped in tuberculous growths, some being sequestered, some transformed into tuberculous masses. The seat of the disease was in the common carpal sheath of the flexors. The first attempt at tapping had set up inflammation, which was increased by the incomplete évitement.

The second case was that of a mechanic, 27 years of age, admitted for a deep-seated tumor, appearing at the volar aspect of the fourth finger, in the palm, and just above the wrist, and impairing the movements of the fingers. An incision was made, disclosing tuberculous disease of the tendon-sheath. A week later, amputation of the forearm was performed, the wound healing in eight days. Two months later he was dismissed with induration of the axillar lymphatic glands, refusing to have them taken out. Examination of the parts removed revealed tuberculosis of

the tendon-sheath of the finger, of the common carpal sheath, and of the synovial membrane of the wrist-joint.

The third case was a girl, 8 years old, who had complained of pain in her foot on walking, for three months. For one week a tumor, about 2.5 cm. in diameter, had appeared below and in front of the external malleolus, red, and painful to the touch, but not impairing motion. An incision gave vent to pus, concealed in a cavity enclosing the tendon of the peroneus longus and lined with a tuberculous membrane. Iodoform dressings. Two months later the patient had completely recovered.

In the last case, a woman of 33, the back of the thumb had been swollen for many years; for three years a swelling had appeared on the back of the left hand, over the fourth metacarpal bone, fluctuating and elastic on pressure, and painless. Incision was made and the tumor removed, in which the microscope revealed tuberculous elements; 14 days later she was dismissed, with excellent motor function of the fourth finger. The thumb was not operated on.

Abstracting from these cases, the author considers tuberculous disease of the tendon-sheaths under the following heads:

- (1) Primary: (a) acute; (b) chronic; (A) non-suppurative; (B) suppurative.
- (2) Secondary: (a) non-suppurative; (b) suppurative.

Acute primary tuberculous tendosynovitis probably occurs with miliary tuberculosis. The tendon-sheaths, being complete sacs, closed on all sides and possessing visceral and parietal walls, may become diseased either diffusely or circumscribedly. In the former case, the disease begins in a chronic manner, with a slight swelling, increasing only very slowly to a height of one or two centimeters in the course of two or four years, and causing increasing immobility; there is no sensitiveness on pressure, the swelling is soft to the touch, fluctuating. The skin is normal. There are no symptoms of inflammation. The tendon is enveloped, to a circumference of 1 cm., in a reddish-grey, soft, sarcomatous mass. The tendon itself is not affected. The lumen of the sheath is occluded.

The circumscribed form of the disease attacks especially the terminal openings of the sheaths, and occasions a sharply defined round swelling half the size of a walnut. Here the tuberculous masses present a confining capsule about them. There is some analogy with synovial tuberculosis; the course of the disease is chronic; there is considerable swelling; no pain; little impairment of function,—as long as the disease remains localized.

The course of the disease is the same in both these forms. If no interference is made, the capsule is ultimately perforated, the skin is destroyed; septic infection occurs; the growth, too, encroaches upon the tendon, penetrating between its fibres.

The tuberculous masses may suppurate, for instance, if massage has been resorted to. In this case perforation takes place into the joint, or into the surrounding tissues, or into a tendon-sheath, in which case the secondary suppurative tendovaginitis occurs.

It must still be considered an open question, whether suppurative tuberculous

tendo-synovitis may be primary. The secondary form is more frequent. The symptoms are less marked, as the trouble is caused by progressive invasion of the disease from the neighboring parts.

The diagnosis may be made in contradistinction to hygroma, ganglion, or cyst, by the help of probatory paracentesis; but malignant tumors and syphiloma can only be excluded after an incision.

The tendon-sheaths of the fingers are more frequently the seat of the primary, the peroneal and extensor tendon-sheaths of the foot, of the secondary disease.

The disease may attack perfectly healthy individuals. Extirpation is possible without detriment to the tendon, as long as the sheath is imperforate, without fear of recurrence. But when long tendon-sheaths are extensively affected, and the tendon proper is pervaded by tubercular deposits, evident is of no more avail than in tuberculous joint-disease, etc., so that amputation may become indicated.

Conservative treatment is of doubtful efficacy. A diseased tendon-sheath should not be treated with massage, for fear of inducing suppuration.—*Deutsche Zeitschr. f. Chir.* 1884. Dec. 18. Bd. 21. Hft. 3 and 4.

W. VAN ARSDALE (New York).

II. THE SURGERY OF SCROFULOUS GLANDS. By T. PRIDGEN TEALE (Leeds). In a clinical lecture the author strongly advocates surgical interference in cases of scrofulous glands. His conclusions may be thus summarised: That gland cavities and sinuses can be healed by thorough scraping with Volkmann's or Lister's scoops. That the visible abscess has for its source, as a rule, a degenerate gland, under the deep cervical fascia, and sometimes even submuscular, the communication between the two being a small opening just large enough to admit a probe or director. That it is therefore futile simply to incise or puncture such a subcutaneous abscess. That sinuses should be enlarged and scraped, and all their blue skin and overhanging edges removed. That the gland should be sought for and eradicated. That where the gland has suppurated, and generally when it has become caseous, the capsule should be freely opened, and the contents should be eviscerated by the scraper. That the cavity should be cleaned with carbolic acid, 1 in 40, and then charged with iodoform. An india-rubber drainage tube should remain until there is reason to suppose that all is healed except the track of the tube. This period will vary from three to ten weeks.—*Med. Times.* 1885. Jan. 10.

WM. THOMSON (Dublin).

III. CASEOUS LYMPHATIC GLANDS AND THE IMPORTANCE OF THEIR EARLY REMOVAL. By GEO. R. FOWLER, M.D. After adverting to the still uncertain nature and pathology of tuberculosis, the author confines his remarks to clearly defining the necessity of establishing a prophylaxis against general tuberculosis by the early extirpation of caseous lymphatic glands. He therefore urges that what may appear to be an innocent cheesy gland is really the site of material which rapidly becomes propagated, and constitutes the so-called caseous lymphadenitis. That this caseous

mass probably is the bearer of, or the soil proper for, the spore or germ upon which the anatomical product known as tubercle depends for its formation. That there is a varying period of quiescence, during which no advance of the disease occurs, but during which the patient is continually threatened with general tuberculosis. That whenever such caseation is within reach of surgical art, early, complete and thorough removal should be practiced.—*New York Medical Journal*. 1885. Jan. 10. Vol. XLI. No. 2.

G. R. BUTLER (Brooklyn).

IV. EXPERIMENTAL RESEARCHES ON CICATRIZATION IN BLOOD VESSELS AFTER LIGATURE. By N. SENN, M. D. (Milwaukee). An exhaustive paper, including a consideration of the history of the ligature, the histology of the blood vessels, the various modifications of the ligature, in addition to a careful and critical collation of the literature on the immediate subject of the paper, as announced in its title. Details of fifty-four experiments upon animals, mostly sheep, then follow, concluding with a series of practical remarks and suggestions. The conclusions of the author are summarized as follows:

All operations on blood vessels should be done under antiseptic precautions.

The aseptic catgut ligature is the safest and most reliable agent in securing provisional and definitive closure of blood vessels.

A thrombus after ligature is an accidental formation which never undergoes organization, and takes no active part in the obliteration of a vessel.

The intravascular, or definitive cicatrix is the exclusive product of connective tissue and endothelial proliferation.

Permanent obliteration in arteries takes place in from four to seven days, in veins in from three to four days.

In ligating vessels in aseptic wounds the vessel sheath can be opened freely without compromising the integrity of the vessel tissues, and such procedure renders the operation safer and easier of execution.

The double aseptic catgut ligature should be preferred to the single ligature in ligating large arteries in their continuity near a collateral branch, and should always be employed in all operations of tying varicose veins in their continuity as the safest and most effective measure in producing definitive obliteration.—*Transac. Amer. Surg. Assoc.* Vol. II. 1884.

V. CASES OF HÆMOPHILIA. By DR. PAUL WAGNER (Leipsic). The author, formerly an assistant to Prof. Thiersch, publishes five cases of hæmophilia observed during the years 1877 to 1883 in the Leipsic University clinic. The first was that of a man, thirty-five years of age, who, though made aware of the danger incurred, insisted on the removal of an atheroma of the cheek, and who could not be dismissed from the hospital for thirty-nine days, during which period his life had been in extreme danger from continued loss of blood.

The second case was that of a student, twenty years of age, who had bled profusely twice before, once on having a tooth extracted five years previously, and again one year before on receiving a slight wound in a duel, and who, on the 24th November,

1881, received a sabre cut through the left cheek. Hæmorrhage stopped after twenty minutes on compression and application of sutures, but commenced again on the fifth day; the wound had not united on removing the sutures, and as repeated efforts and application of chloride of iron dressings proved useless, he was brought to the hospital on the 10th October. He at that time presented considerable anæmia; the wound had become septic by communication with the oral cavity; the margins were swollen and ecchymosed, and covered with offensive pus. The whole of the wound showed an oozing of blood, but no arterial hæmorrhage. Treatment with actual cautery (Paquelin) and iodoform dressing; a bunch of iodoform gauze being stuffed into the mouth. Hæmorrhage continued, however, till the afternoon, when iron chloride cotton was used for dressing. In the evening the hæmorrhage had stopped. The next day considerable swelling of the whole side of the face had set in, no further bleeding, however, occurred; the wound was cleansed on the 14th. The iodoform tampon in the mouth had done excellent service, and had been allowed to remain fifteen days. The patient was dismissed as cured 18th January.

Third case: A railway laborer, twenty-three years of age, of healthy family, who had previously bled profusely after slight injuries, was struck in the left hand by a fellow laborer during a quarrel with a knife—the point had broken off and could not be found. Hæmorrhage had occurred several times, and the fore-arm was swollen, red and painful. He was admitted to the hospital on 8th July, 1877, twelve days afterward, in a very anæmic condition. The wound, which was three centimetres in length, and situated on the radial aspect of the fore-arm, showed an oozing of bright-colored blood. The radial artery was found to be wounded. Incision was made, a double ligature applied, the artery severed between the two, and finally the broken point of the knife, $1\frac{1}{2}$ cm. in length, extracted from the region of the triquetral and pisiform bones. The wound was thoroughly disinfected, a counter opening made, drainage tubing applied, and constant irrigation with salicylic solution kept up, salicylic cotton being used as dressing. During the following days the patient did well; the evening temperature, however, was 39.0° and 39.4° C., and the tumor increased and ascended. On the 14th a severe parenchymatous hæmorrhage occurred, which was met by application of chloride of iron wadding; on the 15th and 17th further hæmorrhages occurred. On the 18th chloride of zinc, one in two parts and actual cautery was resorted to. Temp., 39.1° C. Pulse, 96. On the 19th epistaxis. On the 20th the sloughs began to loosen; renewed epistaxis. Ordered acid sulphuric Halleri. 21st: renewed hæmorrhage from wound. Ordered ergot. Actual cautery was found of no avail, as the bleeding continued through the eschar. On the 22nd great anæmia obtaining, the pulse being weak, 100, amputation of the upper arm was performed with all antiseptic precautions, digital compression of the axillar artery being made; no drainage tubes were used and elastic bandages applied. The patient, who had gone into a state of collapse during the operation, was sustained by excitants, and did well till the 26th, when the dressings became suffused with blood, and a rise of temperature to 40.0° C. set in.

Blood and fresh coagula were found between the flaps; the sutures were removed. Dressings with salicylic cotton. The stump could no longer be kept completely aseptic, oozing of blood continued; on the 28th vomiting and fainting, on the 29th renewed hæmorrhage occurred, till, on the 30th, death set in, the autopsy revealing only anæmia.

The fourth case is that of a $5\frac{1}{2}$ years old boy, who had frequently bled very freely; his sister's child was said to be a bleeder. On the 19th May, 1883, a younger brother in play struck a nail perpendicularly through the child's tongue, whereupon a severe hæmorrhage set in, lasting several hours. After subsiding for one day, on application of vinegar and water, it began again on the 21st, when the child was admitted to the hospital in a state of great anæmia. The tongue was found to be perforated near the tip, but was not swollen. The oozing continued from the lower opening, and a ligature was here applied on the 23d in narcosis. On the 24th slight hæmorrhage from the upper aperture, and on the 25th from both occurred. Actual cautery. On the 26th renewed bleeding, on the 29th more profuse hæmorrhage, waxy pallor, pulse 130. 30th. Profuse bleeding at night. Cauterisation renewed. On 1st June, as loss of blood and strength continued, the whole tip of the tongue was ligated with a rubber cord, a silk ligature being passed through the frenulum. No further hæmorrhage occurred till the tip of the tongue had sloughed off on June 6th, when bleeding recommenced at night and continued on the 7th. Anæmic convulsions set in, with extreme frequency of pulse, and death occurred on the 8th. The post-mortem revealed fatty degeneration of the heart and anæmia of internal organs.

The last case refers to a tailor, aged twenty-one, who had lost two brothers by hæmorrhage, whose parents, however, as well as four other brothers and sisters, were healthy. The grandparents had likewise been healthy. He had suffered previously from epistaxis, and had sudden swellings of the joints with pain. He had been in the hospital for two weeks in September, 1880, with such an affection of the left ankle joint. At that time the right arm appeared flexed in the elbow and movement was impaired.

On August 9th, 1881, he was again admitted, sudden pain having come on in the right elbow and wrist; the right fore-arm appeared swollen, and the capsules of both these joints were extended by effusion. The fingers were flexed. The skin was not affected. Salicylic acid was given without effect. The temperature ranged to 39° C. Subsequently the skin became infiltrated, and the infiltration of the muscles extended all around the whole arm till the 8th September, when the skin was again normal, but the stiffness and induration of the parts continued. 3d October: Epistaxis. Massage commenced on right hand. 1st November: Bleeding from the gums. On 9th November a decayed tooth, which had caused the patient much suffering, was extracted at his desire, hæmorrhage continued for three hours, recurred on the following day, till cotton with chloride of iron was applied. The cheek became much swollen, and hæmorrhages continued till 17th November, occurring again on December 5th. On the 16th November the right knee swelled up, and was painful till the

20th, when the symptoms subsided. Epistaxis occurred once subsequently; but the patient improved steadily until his dismissal in February, 1882. He was again seen in January, 1883, when he was suffering from a similar infiltration of the left arm. The right arm remained impaired in function and movements.

The author quotes Grandidier, Immermann, König, and is himself of opinion that the joint affection is of the nature of a true hæmorrhage, and not merely a serous effusion, and refers to a case in the clinic of Göttingen where incision into such a joint was made, and the patient died from loss of blood.—*Deutsche Zeitsch. f. Chir.* 1884. Dec. 18. Bd. 21. Hft. 3 and 4.

W. VAN ARSDALE (New York).

VI. RECTAL ETHERIZATION. By DR. GEORGE A. PETERS (New York). In the course of remarks made upon certain cases of excision of the superior maxilla reported to the New York Surgical Society, December 23, 1884, the author describes a method of rectal etherization, with commendation. In his view the chief danger is either from over-distension of the bowels with ether vapor, or from the deposit of fluid ether in the gut, having been forced through the rubber tube, causing inflammation of the mucous membrane, with which it comes in contact, tenesmus and bloody discharges from the rectum. Experiments demonstrate that a cool rubber tube produces rapid condensation of the vapor driven through it. The amount or rapidity of condensation does not seem to depend either upon the length or caliber of the tube. Ether boils at temperature of 96° F. Theoretically it seems that if the vapor should be super-heated it would condense less rapidly. This may be accomplished by keeping the vaporizer immersed in water whose temperature is kept as nearly as possible at a temperature of from 103° to 105° F. If the temperature is raised to 120° or 130°, the ebullition becomes so active as to drive over the fluid ether in considerable quantity.

A very simple and ingenious apparatus, by means of which the desired results may be secured (contrived by Dr. O. C. Ludlow), is thus described: Two glass phials of a capacity of from six to eight ounces. One phial, intended as the reservoir for containing a supply of ether sufficient in quantity to last throughout the entire operation, should be marked with graduate lines, so that the amount used may be accurately measured. This is connected with the second phial, intended to be used as the vaporizer, by a rubber tube with a forcing bulb, as in Davidson's syringe. Phial No. 2 is placed in a jar of water with a thermometer, so that the water may be kept at the required temperature. To a curved glass tube, projecting through the stopper of phial No. 2, is attached a rubber tube about two feet long, on the distal end of which is a rubber nozzle for introducing well into the rectum. Into this rubber tube, about eight inches from the nozzle, is inserted a short glass tube, from which the apparatus can be easily detached when the vapor is not needed; the glass also enables one to discover when fluid ether is being driven through it. Through the cork stopper of phial No. 2 a second glass tube is passed, which tube receives the rubber from phial No. 1, through which ether is fed, as required, from the reservoir. When a sufficient

quantity of vaporized ether has passed into the rectum, the tube is slipped off from its glass attachment near the anus and left *in situ*. The connection can be readily re-established when more vapor is needed. This tube left in the rectum has also the advantage of affording a ready escape for any excess of ether vapor which may have been driven on, or for gases generated in the bowels. Dr. Peters stated that the results of ether thus administered in two operations, performed upon a single patient, were eminently satisfactory. The patient was profoundly anæsthetised, and the anæsthesia continued for some time, but he came out from under the influence of ether with less subsequent annoyance than usually followed the administration of this anæsthetic. He thought the method worthy of further trial.

In the discussion that followed, Dr. Sands said that he had had the privilege of witnessing the operation described in the paper, and, being only a spectator, he was perhaps able to observe the effect of the anæsthetic better than those who were engaged in performing the operation. It had seemed to him that the ether was but little under the control of the administrator, and that, in spite of the precautions used, a very large accumulation took place in the intestine, with the effect of producing cyanosis and very deep anæsthesia for a period which made a bystander feel anxious with regard to the result. He would hesitate, from what he had observed in this case, to adopt this method as a substitute for inhalation in the ordinary way, even in operations of the kind mentioned.

Dr. Bull had had considerable experience with etherization by the rectum, the results of which he had already published. He had administered ether in this manner in seventeen cases, and had reached the conclusion that the method should not be practiced, because in a large proportion of those cases the reaction which followed on the part of the intestinal tract was very considerable. In some cases there was diarrhœa with bloody passages, and in others ordinary serous diarrhœa, and the diarrhœal discharges seemed to occur without very much reference to the apparent good general condition of the patient. In one case the diarrhœa continued for two or three days after the operation. Judging from his own experience, he was unable to call etherization by the rectum a safe procedure, and this conclusion had been confirmed by the occurrence of deaths from ether administered in this way in different hospitals, and where there was nothing in the nature of the operation which would have imperiled the life of the patient.

VII. DIMETHYL ACETALE AS AN ANÆSTHETIC. By Dr. F. FISCHER (Strassburg). A mixture of dimethyl acetale and chloroform (in the volumetric proportion of two to one) having been recommended for anæsthesia by von Mering, it was tried in a number of cases at the Strassburg surgical clinic in the winter of 1882, the results of which are published by the author.

The compound in question, represented by the formula $C_4H_{10}O_2$, and of 0.87 spec. grav., has its boiling point at $64^{\circ}C.$, and is therefore better adapted to be mixed with chloroform (the boiling point of which is $62^{\circ}C.$) than is ether, which, owing to its much lower boiling point at 35° , and consequently to its earlier evapo-

ration, is not suitable for mixing with chloroform. Its action on the heart is not depressing, as are all combinations of chlorine, including chloroform, bichloride of methylene, chloral hydrate; it acts principally upon the respiration.

Having verified these effects upon animals (frogs' heart-beats sank from 90, under the influence of chloroform to 72, under dimethyl acetale to 90, and under the mixture to 90, and the arterial blood-pressure sank under the mixture, inhaled, from 116 mm. Hg. only to 104; while an intravenous injection of dimethyl acetale caused it to sink from 123 to 97 mm. Hg.), 150 patients were narcotised with the mixture, Esmarch's modification of Skinner's inhaler most generally being used.

All the narcoses were highly successful.

At first, frequent respiration and excitement obtained. The pulse, however, remained throughout full, hard and regular. In the course of narcosis, the breathing became gradually slower, and never once entirely ceased. No irritation of the mucous membranes appeared; no salivation, coughing, or lacrymal secretion was observed. The pupils were large at first, a slight perspiration broke out just before anæsthesia was complete. No excessive psychical action was noticed, the patients gradually sank into a peaceful sleep. At no time during narcosis was vomiting or nausea observed; the patients were allowed a little milk on the day of operation. The awakening out of narcosis was very rapid, no headache was present, and the general state of feeling was good. Only four times vomiting occurred after narcosis, but these were such cases as had large quantities of liquids given them on account of great loss of blood during the operation. No gastric irritation or incessant vomiting followed. The time necessary to perfect narcosis in robust males was fifteen minutes, and much less in children or anæmic individuals. The mixture does not irritate the skin, and no albumen or sugar is to be traced in the urine.

After giving the cases, tabulated and detailed, the author disapproves of the use of pure dimethyl acetale, as it takes too long a time to produce anæsthesia, and as it is expensive, but recommends the use of von Mering's mixture in all cases suffering from gastric catarrh and excessive vomiting after other anæsthetics; in cases of laparotomy; in cases of heart disease or nephritis; in cases of disease of the central nervous system, epilepsy, or paralysis infantum, and in cases where administration of chloroform causes alarming symptoms, and where narcosis must be continued to the end of the operation.—*Deutsch. Zeitsch. f. Chirurg.* Bd. 21. Hft. V. and VI. 1885.

W. VAN ARSDALE (New York).

Operative Surgery.

I. ON PLASTIC OPERATIONS BY FRESH PEDICULATED FLAPS FROM DISTANT PARTS OF THE BODY. By Prof. H. MAAS (Würzburg). The object which M. aims at is the successful treatment of obstinate ulcers, ulcerating cicatrices, etc. He first cites three published cases where flaps were transplanted after first allowing them to granulate (Thiersch's method). He then quotes the more or less successful at-

tempts with fresh flaps; which, however, have not been considered very encouraging.

Many of his were cases of otherwise incurable ulcers in the vicinity of joints. He describes and illustrates five, all giving good results, besides mentioning a series of other less difficult ones, especially tubercular sores and fistulæ. In these minor cases he cuts his flap so as to leave a zone of healthy skin between its original and secondary positions.

From his experience, this operation succeeds if the following rules are observed:

1. The part from which the flap is to be taken should be immobilized, for which purpose plaster Paris works best. Determine by repeated trials the most tolerable position for the parts while in durance. The lower extremities may be extended, or flexed at knee and hip, with the patient on the side. Each limb should be plastered separately, and then united by a third plaster dressing. Similarly, in operating on arm, bind it firmly to thorax.
2. In making a fresh wound of the ulcer or defect to be cured, special pains are to be taken to first pare off the superficial soft layer of granulations, which is traversed by numerous perpendicular vessels. Only the deep layer of moderately firm connective tissue and horizontally arranged vessels should be left. This accords with Thiersch's rule in making Reverdin's transplantations; in fact, M. takes Thiersch's investigations as the basis of his method.
3. The flaps must be cut as much as possible in the direction of the vessels, even though this necessitates more twisting of the flap-pedicle. Whether we should first apply the plaster or prepare the flaps depends upon the position of the parts.
4. The flap must be sutured as exactly as possible in its new position, and buried sutures or pressure applied. It is very necessary to protect the free raw portion of the flap and the fresh wound from drying, and consequent necrosis. M. uses boracic ointment, spread thick on gauze. Strict antisepsis, of course, with dressing which likewise protects from harm.
5. Pedicle may be severed from the tenth to the fourteenth day, and this done completely at one stroke, and not piecemeal. In one case where it was cut on the seventh day the flap was preserved, though the epithelium at first exfoliated.

The flap very soon regains its sensibility, and takes on the character of the surrounding skin, even when transplanted to the heel; underlying joints become movable, etc.—*Arch. f. klin. Chirg.* 1884. Bd. 31. Hft. iii.

W. BROWNING (Brooklyn).

Head and Neck.

I. EXTRACTION OF A PISTOL BALL FROM THE BRAIN THROUGH A COUNTER-OPENING IN THE SKULL. By W. F. FLUHRER, M.D. (New York). The patient, a healthy man, aged nineteen years, shot himself with a pistol held in contact with his forehead. About twelve hours afterwards, when seen by the surgeon, he was semi-unconscious, aphasic, with complete loss of motion without loss of sensation on the

right side below the head. Left side hyperæsthetic. Pupils equally dilated. Pulse, 100; temperature, 101.4° F. Patient was etherized, and, under the protection of copious irrigations of corros. subl. sol. 1-1000, the wound of entrance (nearly in the centre of the forehead) was enlarged, including also the wound in the skull. This procedure was complicated by hæmorrhage from a branch of the anterior cerebral artery, which was finally controlled by a small compression forceps left *in situ*. The track of the ball through the brain was then probed by a bulb-pointed copper probe, and the point on the scalp noted at which the probe would emerge if projected through the head. At this point the cranium was exposed and trephined. The trephine hole was enlarged with a *rongeur* toward the assumed opening of emergence of the bullet; the dura mater was slit in the same direction. Some effused blood and disintegrated brain matter appearing, more of the skull was cut away, and the slit in the dura mater prolonged, until a gush of brain matter, and a rent in the pia mater, demonstrated the point of impact of the bullet. The probe was introduced through the opening in the pia and passed downwards toward a point where a feeling of resistance had previously been felt with the tip of the finger applied on the surface. At a distance of an inch the bullet was detected, and then extracted with a slender-bladed forceps. It weighed 42 grains. A small-sized rubber drainage tube was then introduced along the track of the ball through the brain, and the projecting ends cut off to within an inch and a half of the skull. Iodoform dressings, with an external protective layer of borated cotton, were applied. The after history of the case was one of gradual but progressive amendment. On the sixth day the drainage tube was withdrawn, and replaced by a drain composed of four strands of catgut and ten of horsehair. On the eighth day the compression forceps was found to be loose, and was removed. On the tenth day a cystitis had developed, which caused much annoyance for several days. On the thirteenth day the strands of catgut had become absorbed, and four strands of horsehair were withdrawn. Considerable cerebral irritation followed this proceeding, and, it seeming that the presence of the remaining hairs was exciting further disturbance, they were all withdrawn on the fifteenth day. An hernia cerebri had developed at both cranial openings. On the twenty-fifth day the patient was entirely free from pain, and his temperature, respiration, and pulse were all normal. After the thirtieth day the hernie cerebri, which up to this time had been simply protected from irritation, were subjected to slight continuous pressure. They gradually shrunk, and by the end of three weeks more had disappeared. By the end of the second month after the operation the posterior wound was completely cicatrized. Three weeks later the anterior wound also was healed, and the tissues at the openings in the skull were slightly depressed below the level of the surrounding scalp. After leaving the hospital the patient returned to work, a slight impairment of memory being the only apparent consequence of his wound. He follows the same occupation, and performs the same duties in it as before he was shot. A severe blow accidentally made upon the anterior scar some months after returning to work determined a violent convul-

sive attack, which recurred at the end of three weeks. Bromides were freely given, and no further recurrence had taken place when the report was made, six months later.—*New York Med. Journ.* 1885. March 28.

II. REMARKS ON DEATH FOLLOWING ENUCLEATION OF THE EYEBALL. By A. HILL GRIFFITH, M. D. This article, which was read in the section of ophthalmology at the meeting of the British Medical Association at Belfast, describes two cases of death after enucleation in the wards of the Manchester Royal Eye Hospital. The first was that of a man, aged 71, suffering from rodent ulcer of both lids of the right eye, the globe itself having atrophied. The treatment was commenced by the enucleation of the globe. The operation was performed in usual way without presenting anything unusual, and the man died in six days from symptoms of meningitis. After death a quantity of purulent exudation was found covering the whole of the upper surface of the right hemisphere of the brain. The orbit was normal, and no connection could be traced between the pus on the surface of the brain and either the orbit or temporal bone. The brain itself was perfectly healthy. The second case was that of a woman, aged 48, whose right eye in a condition of panophthalmitis was excised in consequence of the severe pain to which it gave rise. She died, without rallying from the operation, on the eighth day. At the post-mortem an effusion of thick, tenacious adherent lymph was found over the greater part of the convexity of the right cerebral hemisphere. In the region of the sphenoidal fissure and of the optic nerve no evidence of inflammatory effusion was observed. The brain substance was healthy. The right orbit was opened and the stump of the eye examined, but no marked changes were observed. The sheath of the optic nerve seemed somewhat hyperæmic. On inquiry into the literature of the subject the author has been able to find the records of six cases of death from meningitis after excision of the eyeball, and on analyzing these cases the important fact becomes evident that in four of them the enucleated eye was in a condition of panophthalmitis. He believes that although there was no post-mortem proof of the connection between the meningitis and removal of the eye in five of the cases referred to in which an autopsy had been made, still there is clinical evidence sufficient to show that the development of the head symptoms after the operation was something more than a mere coincidence, especially in the panophthalmic cases. The theory that panophthalmitis can of itself cause meningitis is not applicable to the above quoted cases, because when death results from meningitis after cellulitis of the orbit, there is a direct connection easily traced by the naked eye between the orbit and the meningeal affection.

He concludes by remarking that in the face of these facts he would not feel justified in enucleating a case of panophthalmitis except under one condition, namely, in impending sympathetic affection of the other eye.—*Brit. Med. Journ.* 1884. Dec. 27.

III. ON THE TREATMENT OF DETACHMENT OF THE RETINA. By J. R. WOLFE, M. D. The author in this communication, which was addressed to the Academy of Medicine of Paris, discusses the method of treating detachment of the retina, which he has followed since the year 1878. The principle of the treatment which he advo-

cates is based upon the opinion that the effusion in these cases should be treated in the same manner as other effusions in serous cavities, as for example in the pleura or in the peritoneum. He consequently withdraws the effused fluid by a sub-conjunctival sclerotomy, practised in the meridional direction. The following are the steps of the operation in cases where vision is nearly or entirely abolished, and the retina is largely detached: The patient is first examined by the erect ophthalmoscopic image in order to ascertain the site of the detachment, and also to which side the effused fluid inclines. In order to render this examination complete the patient's head must be placed in various positions. Thus with the patient sitting upright, and then also with the head placed in a horizontal position, he is made to look upwards and downwards, to the right and to the left. The side to which the fluid inclines in the different positions of the eyeball having been thus ascertained, chloroform is administered to the patient and the ophthalmostat introduced. A vertical incision is then made into the conjunctiva half an inch long in the region of the detachment. The lips of the wound are separated by an assistant in a horizontal direction by means of two strabismus hooks. The capsule of Tenon is then opened, the sclerotic laid bare, and by rotation of the eyeball the corresponding part of the sclerotic exposed, towards which the fluid inclines, into that part a broad needle is introduced, having an external flat surface and an internal convex surface. The needle is gently withdrawn without the slightest inclination, and the liquid flows on the withdrawal of the instrument. The instrument is introduced obliquely, in such a manner that the edges of the scleral wound should overlap each other, and not remain gaping when it is withdrawn. The lips of the conjunctival wound are brought together with one or two fine silk ligatures, and both eyes are shut by three strips of court plaster lint and a bandage. The patient is required to lie upon his back for two or three days, as after the extraction of cataract. On the third or fourth day the simple dressing is renewed without opening the eyes, but on the fifth day the eyes are opened and the results of the operation ascertained. By this time there is generally not the slightest trace of an operation left. Of seven cases which have been recorded from the author's clinique, three have resulted in perfect success, where the method here described has been followed. The state of total blindness in each has been cured, so that the patients could return to their ordinary occupations. In each of the four other cases the success was partial. There is a full description of a case upon which the author operated in the Ophthalmic Hospital at Paris, the result being most satisfactory. The points of distinction between scleral puncture as proposed by Gräfe, and the operation as practiced by the author, are clearly given, and in the latter case the necessity of the ophthalmoscopic examination of the eye in various positions, and the importance of the liberating of the eyeball from its envelope, so as to render visible and bring into proper position the part behind the equator towards which the fluid inclines, insisted upon.—*Brit. Med. Journ.* 1884. Dec. 20.

H. PERCY DUNN (London).

IV. RESULTS OF OPERATIVE TREATMENT IN TWO CASES OF TRIGEMINAL NEURALGIA. By J. C. HUTCHISON, M. D. (Brooklyn). CASE I. *Neuralgia of third division of fifth nerve:*

1. Removal of the right upper molar tooth was followed by relief from pain for three weeks, although there had been no pain in the course of the superior maxillary nerve at any time.
2. Removal of the alveolar processes of the lower jaw gave complete relief for more than five months, but how much longer I cannot state.
3. Excision of the inferior maxillary nerve relieved the pain for three years.
4. Ligature of the left common carotid resulted in relief from the neuralgia for three years and eight months. No cerebral symptoms followed the operation, and none have appeared after the lapse of nearly four years.

CASE II. *Neuralgia of first and second divisions of fifth nerve:*

1. Incision of the scalp with no benefit.
2. Excision of the branches of the supra-orbital nerve near the supra-orbital notch, and at the same time incision of the infra-orbital filaments of the superior maxillary nerve near the infra-orbital foramen, relieved the neuralgia for six months.
3. Removal of half an inch of the superior maxillary nerve from the infra-orbital canal was followed by freedom from pain for an unknown period of time.
4. Excision of the superior maxillary nerve in the infra-orbital canal was repeated ten years after the last operation, but the neuralgia returned so soon as the incisions had healed.
5. Ligature of the right common carotid twelve years after the last operation. There was no relief from pain, and no cerebral symptoms followed the operation.
6. Removal of the superior maxillary nerve from the infra-orbital canal a third time, a little more than ten years since it was last removed. During the two months and a half after the operation that he was under observation he was free from pain, but then began to complain of neuralgia in the inferior maxillary nerve. I then lost sight of him.

The operation of tying the common carotid artery for trigeminal neuralgia, which was first recommended and practiced by Nussbaum and Patruban, has been practiced by other surgeons with a fair amount of success. The author thinks this operation to be worthy of further trial in severe cases which have resisted all other treatment. —*Proceedings of New York Surgical Society.* 1885. March 24.

V. STRETCHING THE FACIAL NERVE. By DR. C. KAUFMANN (Zürich). This nerve was first stretched by Baum, Jr., in 1878. Bernhardt (1881) found that in no case of convulsive tic had a cure been thus effected; ditto Nocht in 1882.

Kaufmann adds another failure. The trouble dated back seven years; five days after the operation it was as bad as ever.

In the earlier operations the facial was taken at the stylo-mastoid foramen, the cut being made along the front edge of the sterno-mastoid muscle. To simplify matters Hueter cut down just at the posterior edge of the jaw through the skin, fascia and

parotid, and followed back the lower half of the facial. K. says that in this way it is difficult to follow the nerve farther back than to the external carotid, or at most 2-3 mm. beyond. In operating according to Hueter's method, Kaufmann found that in some way the rami zygomatici were not included in what appeared to be the nerve trunk; this led him to study its variations. Very frequently there is one main trunk which rapidly divides into branches (see atlas of Heitzmann); often again the trunk is very short, with one pronounced upper branch, the lower immediately splitting into several (*Henle's Anatomy*). K. believes his case to have been a counter part to the following dissection: 4 mm. from the stylo-mastoid foramen a large branch passed upwards, at a right angle from the facial trunk, and shortly separated into the temporo-frontal and zygomatic twigs. The buccal twigs as a second branch separated off over the external carotid. He proposes as the only sure way of securing the whole facial to first expose the lowest branch, *nerv. subcut. colli sup.*, then make an oblique incision along the course of this branch through skin and parotid—somewhat bloody, but safe—and thus gain the main trunk.—*Centbl. f. Chirg.* 1885. Jan 17. No. 3.

VI. ON THE MORPHOLOGICAL SIGNIFICANCE OF CLEFTS OF THE JAW, LIPS AND FACE. By PROF. P. ALBRECHT (Brussels). This article is a further exposition of views first put forth by Albrecht in 1879, and which he proposes soon to elaborate into a monograph.

Fig. (1). *Fissures of the Jaw:*

Goethe considered that these fissures passed between his intermaxillary or incisor bone and the superior maxilla. His explanation has always been accepted, unless perhaps his further assumption that such was only the case in double cleft, while in single it passed mesially between the two incisor bones. Albrecht believes that instead of their being but one intermaxillary on each side there are two, and that the occasional fissure invariably passes *between these two*. In men this bone is much less developed than in the animals below him. Consequently to study it to any advantage it is necessary to make an excursion in comparative anatomy. A. points out that the relatively slight use of the incisors by man is clearly the reason why in him this bone is so little developed and unites so early with the upper maxilla. In the horse it is well developed; it has a body and two processes, the palatal and the nasal, the latter separating the superior maxilla entirely from the apertura pyriformis. In the winter of 1878-9 A. first succeeded in demonstrating four incisor bones in the head of a new-foaled colt affected with hare lip and cleft palate. Here the nasal process was separated from the rest of the intermaxillary by the fissure; the process passed up beside the apertura pyriformis just as in the usual form. While normally the horse has two incisors on each side, here there were three (hyperodontia), two in the body (*corpus os. intermax*) and one in the nasal process. He has since seen a large number of such cases, and in each the fissure was likewise *intra incisive*, in no one did it coincide with the sutura incisiva. The two inner intermaxillaries are united at

the median symphysis, while each external one, represented by the nasal process mentioned above, is joined to the respective nasal and superior maxillary bones.

He next examined like malformations in calves, and arrived at the same result as from the horse.

In men, if the old theory were correct that the fissure occupied the *sutura incisiva*, there should be three milk teeth external to the fissure and two between it and the median line. He takes the illustrations in well-known German works as the best evidence that such is not the case; in them there are four milk teeth external to the cleft, and but one internal, and this in single as well as double cleft. In all accessible atlases and illustrations he finds the same—four outside and one, or sometimes two, inside. The lateral incisor being thus separated off from the median, he proposes to call it the *præcanine tooth*. The same arrangement is of course also found in the adult cleft palate. He further finds, at least in some cases well marked, a co-existing *sutura incisiva* between the lateral incisor and the canine tooth. Further, according to Goethe's theory the cleft could never run into the pyriform aperture—in reality, however, it always does. With regard to the extra incisor seen in equine cleft palate and occasionally in the human, he finds that it sometimes appears in normal human sets of teeth even in the lower jaw; that it is really the middle one of the three; that it represents a lost tooth which is usually crowded out, but that in cleft palate the naso-palatine artery, being cut off from its anastomoses, has a much smaller territory to supply, and thus tends to develop the usually abortive germ, and also to an unusual degree the vomer and inner intermaxillary, thus making them so prominent. He gives also a schematic classification of these various arrangements of the teeth, of the adjacent bony processes and fissures, their development, etc.

2. *Labial Fissures:*

His classification of these is derived from his previous conclusions and the development of the face. He makes out eight lips: two internal interlabia, corresponding to the two internal intermaxillaries; two external interlabia, corresponding to the two external intermaxillaries; two supra labia, corresponding to the upper maxillæ, and two infra labia, corresponding to the two lower maxillæ. Accordingly we have the following labial fissures, which A. represents graphically by broken lines: 1. Median fissure of the upper lip, repeatedly seen in man. 2. Harelip, between interlabium internum and same externum. Since it runs towards or into the nostril it is a labio-narine fissure. 3. Colobom of the upper lip, between interlabium externum and supralabium. It does not run into but outside the nostril, and is therefore not to be confounded with the preceding. 4. Harelip complicated with colobom. He was able to show the double form of this complication on a puppy's head. 5. Macrostomic labial fissure, between upper and lower lip, a lesser degree of what is called macrostomy. 6. Median fissure of the lower lip. Cases also occur showing various combinations of these.

3. *Facial Fissures:*

He considers these to be rather cheek or buccal than facial fissures. They separate

the cutaneous resp. mucous derivatives of the nasal and maxillary processes, as did likewise the labial fissures, yet occurring sometimes independent of the latter. He makes eight cheeks (buccæ) corresponding to the eight lips, two interbuccæ internal and two external, two supra and two infrabuccæ. Theoretically there would be eight buccal fissures: 1 and 8, median above and below are unknown; 2 and 3, between interbucca interna and externa, when harelip extends up so as to split the nasal wing (fissura alaris), of which he had an example; 4 and 5, between interbucca externa and suprabucca. An extension of colobom of the lip; the two together form what is called a labio-palpebral fissure; when the former exists alone it is called a colobom of the lid; 6 and 7, between suprabucca and infrabucca, macrostomic buccal fissure, commonly called macrostomy.—*Arch. f. klin. Chirurg.* Bd. 31. Hft. II. 1884.

VII. SO-CALLED CONGENITAL CAPUT OBSTIPUM AND THE OPEN SECTION OF THE STERNO-MASTOID MUSCLE. By R. VOLKMANN (Halle). This includes a semi-critique of a recent article by Petersen. He agrees with P. that the etiology is not satisfactorily established, but differs from him in thinking that rupture of the muscle may have some causal action. He finds, on a basis of twelve cases, two classes, in one of which there are no changes of the muscle; in the other it is cicatrized, or almost wanting. Of course there are many intermediary forms. Malposition in utero cannot be a cause, though traumatic disturbance at birth may be, especially severe straining or rupture of the upper vertebra and their ligaments. Treatment by open section of muscle and extension for a few days gave uniformly good results.—*Centbl. f. Chirg.* 1885. April 4. No. 14.

VIII. SUBHYOID PHARYNGOTOMY. By Dr. A. IVERSEN (Copenhagen). Iversen could find but eighteen cases thus operated,—six of his own, three of Prof. Studsgaard's, and nine in the literature. Tumors, arising from pharynx, are the usual indication, though Sieffert thus removed a foreign body, and Iversen a cicatricial stricture of superior end of œsophagus. I. could collect but twenty-four cases of primary pharynx-tumors, reported in the last twenty-five years. Of his six cases, one died three days after operation; the others either recovered entirely, or died later of relapses.—*Arch. f. klin. Chirg.* 1884. Bd. 31. Hft. III.

IX. STATISTICAL CONTRIBUTIONS ON THE OPERATIVE TREATMENT OF CARIES FROM OTITIS MEDIA. By Dr. SCHONDORFF (Greifswald). Amongst other cases and discussions, one where the otitis led to abscess formation between dura and skull, near the lambda suture, after it had been opened up thoroughly, and under drainage; patient recovered. Another, of subperiosteal abscess in the temporal region.

In sixty skulls, from adults, he found traces of the fissura squamoso-mastoidea in sixteen, but in two only could bristle be passed into the mastoid cells.—*Archiv. klin. Chirurg.* Bd. 31. Hft. II. 1884.

X. CONTRIBUTION TO THE STATISTICS OF TRACHEOTOMY. By Dr. H. BIRNBAUM (Darmstadt). Other methods of treating croup and diphtheria are first con-

sidered in some detail. Then follow the method of operating, and various tables according to age, season, sex, complications, etc. Of 140 operations in eleven years—1873–1883—forty-seven resulted in cure, or one-third. Of three under one year, one was cured. Most of the patients were under six years. Monti (1884) collected 12,736 cases, with 3,409 cures.—*Archiv. für klinische Chirurgie*. Bd. 31. Hft. II. 1884.

W. BROWNING (Brooklyn).

XI. AFTER-TREATMENT IN TRACHEOTOMY FOR DIPHTHERITIC CROUP. By Dr. G. PASSAVANT (Frankfort). During the course of the after-treatment in cases of tracheotomy, conditions may obtain which prevent the definite removal of the canula. These may be either purely mechanical in character, or may be due to other specific forces.

To the first class belong: (1) intumed cartilages, retained in position by inflammatory products, as obstructing respiration whenever the canula is removed, especially when they are combined with granulation-formations. (2) A tendency on the part of the trachea to collapse on removal of the canula, owing to the incision having been made of too great a length. (3) Tumors and other complications of the disease; these are, however, not considered at length, as not belonging to the subject of diphtheria. To the second class belong: (4) Paralysis of the posterior crico-arytenoid muscle, which of itself forms one of the indications for tracheotomy, and therefore may necessitate continued use of the canula; it may be diphtheritic in nature, or be caused by pressure on the recurrent branches. (5) Spasm of the vocal cords—a condition as yet not sufficiently observed, and questionable in its occurrence—such spasms differing from a contracted state of the antagonists in cases of paralysis, in that the action of the muscles is abnormal, but normal in the latter case. (6) Loss of ability to breathe without a canula, resulting from a long continued use of the instrument and mere want of practice. (7) A psychical condition of anxiety, which may prove an obstacle to the removal of the canula by the child becoming excited and losing its breath, whenever such a removal is attempted.

The author illustrates some of these conditions by detailed histories of cases, one of which had to retain the canula for a period of eight years, the musc. crico-arytenoid. postic. refusing to act during sleep, probably as a consequence of habit; and one, belonging to the last enumerated condition, occurring in a child 7 years of age, where the removal could only be effected by stratagem.

Repeated performance of tracheotomy in the same subject often becomes necessary, the operation having had occasionally to be twice repeated in the experience of the author.

It is sometimes difficult to close the fistula remaining after the removal of the canula; in one case of the author's, repeated operations failed to obtain a satisfactory result. A histological inquiry into the manner in which divided cartilages unite, conducted by Dr. Max Flesch, of Berne, resulted in showing that the cartilage did not coalesce, but that a union was effected by connective tissue, a thin layer of car-

tilage cells only being formed approximate to the cartilages, the thyroid gland being drawn close to the trachea, or even into the incision.

In conclusion, the author turns his attention to the statistical reports on diphtheria, and points out how statistics in general are influenced by the considerations: whether the cases operated were true diphtheria, or only croup; whether the operation was performed in an early or in a late phase of the disease; whether the operator performed tracheotomy without predilection on cases of all ages, or whether those under two years were excluded; whether the cases received good after-treatment or not; whether the place of operation was far removed from or in easy reach of the surgeon, as in a hospital; whether the operator himself was skilled and experienced or not. After mentioning the statistical tables already published, from Trousseau to Jacobi, the author proceeds to enumerate the majority of cases of tracheotomy performed in Frankfort on the Main, embracing a period from 1851 to 1882, being in all 229 cases, 67 of which recovered, or one in four, and the greater part of which were performed by Passavant himself.—*Deutsche Zeitsch. f. Chirurg* 1884. Bd. XXI. Hft. 4.

W. VAN ARSDALE (New York).

XII. SIMULTANEOUS DOUBLE DISTAL LIGATURE OF THE CAROTID AND SUBCLAVIAN ARTERIES, FOR HIGH INNOMINATE ANEURISM. By RICHARD BARWELL (London). The patient was a women, aged 48. The right half of the sternum, the two upper costal cartilages with their interspaces were pulsatile. In the outer half of the episternal notch, and behind the inner head of the right sternomastoid muscle, was a pulsatile tumor which involved the carotid artery. The voice was low and toneless. The right radial pulse was very small, and four days after her admission ceased, when no pulse could be felt throughout the arm nor at the third part of the subclavian artery. The carotid was tied, and as the immediate effect was increased pulsation of the sac, the third part of the subclavian was ligatured lest the obstruction should yield and the aneurism again increase outwards. Ultimately consolidation followed, and she left hospital on May 6, the operation having been done on February 28. On June 4 there was no enlargement at upper part of chest, no cervical tumor, and over the site of the aneurism the percussion note was clear, and the respiratory murmur distinct. This is the sixth case of the kind Mr. Barwell has brought before the Medico-Chirurgical Society. In the discussion which followed, Mr. Holmes dissented from the practice of simultaneous ligature in these cases. He considered the ox-aorta ligature very much better than catgut prepared in any way.—*Lancet*. 1885. Jan. 31.

WM. THOMSON (Dublin).

REVIEWS OF BOOKS.

THE INTERNATIONAL ENCYCLOPÆDIA OF SURGERY: A Systematic Treatise on the Theory and Practice of Surgery, by Authors of Various Nations. Edited by JOHN ASHHURST, JR., M.D., Professor of Clinical Surgery in the University of Pennsylvania. In six volumes. Vol. V. New York: William Wood & Company. 1884. (In continuation of review in number for April.)

Article IX. INJURIES AND DISEASES OF THE NECK. By GEORGE H. B. MACLEOD, M.D., F.R.C.S. and F.R.S. Edin. Senior Surgeon to, and Lecturer on Clinical Surgery at, the Western Infirmary, Glasgow, &c.

The subject is introduced by a brief but practical description of the topographical anatomy of the neck. In considering the tumors of this region careful mention is made of pneumatocele, adenitis, adenoma, lymphoma, cystoma, lipoma, fibroma, enchondroma and carcinoma. No mention is made of the identity of the so-called caseous or scrofulous glands with tubercular diseases in other localities, but in their treatment great stress is placed upon thorough removal of the diseased tissues by means of the sharp spoon under antiseptic precautions. Macroscopical appearances and clinical characteristics are relied upon in the differential diagnosis between carcinoma and lymphosarcoma. In the local treatment of adenoma, interstitial injections of iodine are favorably mentioned. "It causes absorption, with but little disturbance, if used in small and repeated quantities, passed by means of a small hypodermic syringe deeply into the tumor, after the surface has been rendered insensible by the ether-spray." Excisions of hypertrophied glands is recommended when other measures have proved ineffectual, and when the general condition of the patient justifies the operation.

In the treatment of lymphoma the salutary effect of arsenic, either by internal administrations or parenchymatous injections, is considered only apparent, due only to the general depression which it brings about in the nutrient functions—an effect equally seen after attacks of acute rheumatism and erysipelas. This assertion should be accepted only with caution, inasmuch as it comes in serious conflict with the ex-

perience of a number of the most prominent surgeons on the continent, by many of whom arsenic is considered almost a specific in the treatment of lymphoma. Among the congenital cystic tumors the serous variety (hydrocele of the neck, hygroma) is mentioned without an attempt to explain their origin. The great majority of these cysts arise from imperfect closure of a branchial tract, and are therefore closely allied to branchial fistulæ. No allusion is made to a common form of branchial cysts—the atheromatous variety—which, like the serous cysts, originate from imperfect closure of one of the branchial tracts. In the treatment of cystic tumor the author relies mostly on injections of iodine without preliminary washing out of the sac. The injection is allowed to escape before removing the canula. The operation of excision is disposed of in the following language: "Excision has its chief use in dermoid cysts, and in multilocular cysts which threaten asphyxia, when no less serious or difficult plan of treating them is available. Experience does not, however, encourage these operations, and they have proved, in the case of large cysts, very difficult, and sometimes very disastrous. The deep relations of these growths are frequently such that extirpation is impossible." A careful clinical study of all cases of branchial cysts thus far reported must convince anyone that excision is comparatively easy in all cases where the cysts have not undergone inflammatory changes, the result of previous ineffectual treatment or spontaneous inflammation. In case the cyst has become adherent to the large vessels of the neck to such an extent that separation is incompatible with the safety of the patient, partial excision should be resorted to, followed by a careful but thorough destruction of the remaining matrix of the cyst wall by means of Paquelin's thermo-cautery, when the wound is drained and closed in the same way as after complete excision.

The important subject of goitre is disposed of in four pages, without even an allusion to the classical papers of Luecke, Kocher and Wölfler. In the treatment of struma cystica, injections of various irritants, as iodine, tincture of the perchloride of iron, alcohol and ergot are recommended without even mentioning antiseptic drainage and excision, the two safest and most reliable methods of treatment in such cases. In extirpating the solid forms of goitre the straight median incision is advised, notwithstanding that such an incision does not afford easy access to the deeper portion of the tumor, where it is absolutely necessary to expose the important structures and ligate the vessels before dividing them. Kocher's method of operation is based on an accurate knowledge of the location and distribution of the vessels of the thyroid gland and its vicinity, and should be invariably followed in performing such a

difficult operation, where every step presents new difficulties and perplexities. The subject of cachexia strumipriva is not alluded to, nor the advisability of resorting to partial excision of the affected gland with a view to prevent this sequela which so often follows when the whole organ is removed. The remaining articles on exophthalmic goitre, surgical affections and tumors of the parotid and submaxillary glands are well described, and, with a few minor exceptions, the advice given can be safely adopted. On the whole, the subjects treated in this chapter are better adapted for some short text-book on surgery than for an encyclopædic work, where we should naturally look for a more exhaustive exposition of such important topics as "Injuries and Diseases of the Neck."

N. SENN.

Article X. INJURIES AND DISEASES OF THE AIR-PASSAGES. By J. SOLIS COHEN, M.D., Professor of Diseases of the Throat and Chest in the Philadelphia Polyclinic, &c., &c.

A marked characteristic of this article is the evident desire of the author that nothing germane to any aspect of the subject should be omitted. The whole range of medical literature has evidently been very carefully culled and digested, and full references to authorities are given. In mooted points the author, possibly, is too prone to give the opinions of others, while he refrains from formulating positive teachings of his own. Thus, he says, it is questionable whether all wounds opening into the larynx should not be regarded as demanding precautionary tracheotomy. He then states the conclusions of Witte on the subject, and the counsels of Von Langenbeck, but adds no positive direction of his own. All practitioners who have had experience with laryngeal or tracheal wounds will endorse the teaching of the author, in this case positive, that incised wounds involving the larynx or trachea should not be united by suture until there remains no further risk from reactionary hemorrhage. We think, however, that he is clearly in error in advising the entire disuse of sutures in securing apposition of deeper structures. Much advantage can be gained by steadying and holding in apposition the wound edges of severed cartilages by proper sutures through the investing fascia, and by the judicious use of sutures for securing apposition in other deep structures. If sufficient provision be made for the free escape of air, mucus, blood and wound secretions, primary union throughout a considerable area may be expected—certainly it should be aimed at.

The important subject of foreign bodies in the air-passages is quite fully considered. The greatest interest naturally centres upon the

treatment that may be adopted in such cases. With regard to efforts at securing expulsion of a foreign body by the administration of emetics and sternutatories, and by inverting the body and slapping the patient on the back, the author seems to approve of them, for he gives directions as to their most efficient use, and says that notwithstanding the theoretical dangers which seem to surround them, he has been unable to find any record of an instance in which life has been lost as a consequence of them. Should these methods prove inefficient, or be deemed injudicious in any given case, attempts at instrumental extraction are to be resorted to. Extraction by way of the natural passages, the author believes, should be attempted only when the foreign body is situated above the vocal bands. In other cases, being the great majority, an artificial opening into the air-passages from the exterior will be necessary. In this connection we look for a discussion of the conditions, if any, which should determine the time of operating, or at least some mention of the possibilities of expectancy in certain cases. We find nothing of the kind, however, and the teaching of the author is certainly, whether he means it so or not, that should a foreign body of any kind have once passed below the vocal bands, the surgeon has but one thing to do, namely, perform thyrotomy or tracheotomy, and try to get it out forthwith. Here Dr. Solis Cohen evidently is not in accord with the conclusions of Dr. Weist, whose statistics he refers to in an earlier paragraph. The most important conclusion of the latter writer, in the paper which he read before the American Surgical Association in June, 1882, was that, as long as a foreign body in the air-passages was causing no dangerous symptoms, bronchotomy should not be performed. We mention this for the purpose of expressing our satisfaction that Dr. Solis Cohen has not been misled by the imperfectly interpreted statistics of Dr. Weist. We believe that the mature judgment of surgeons, as expressed by Gross, that the diagnosis of a foreign body in the air-passages having been established, "the sooner the surgeon opens the windpipe the better" (*System of Surgery*, ed. 1882, p. 328), is the only rational rule of surgical practice in these cases. The very absence of dangerous symptoms constitutes one of the most favorable conditions for successful operative interference, and the surgeon who waits for suffocative symptoms to have become developed before he operates, seriously handicaps himself in his efforts, while he increases the dangers of operative interference to his patient.

The question of tracheotomy in connection with croup and diphtheria he discusses in a dispassionate and scientific spirit, presenting to the reader an unusually valuable, comprehensive and practical treatise on this subject.

A much greater number of recoveries from croup after tracheotomy in children under two years of age have been recorded than the few cases referred to by the author would lead us to suppose, as witness the 158 cases of recovery in 1,093 operations reported by Monti (*Ueber Croup und Diphtheritis*, pp. 309-311), the table of 93 cases compiled recently by Dr. Jos. E. Winters, of New York, and the eight additional cases reported by Birnbaum in a recent number of the *Archiv. für Chirurgie* (Bd. 31, Hft. 2, p. 346). The three successful cases in adults, two English and one German, which he says are the only ones that he has been able to find, might have been doubled by referring to the American cases reported by Mastin (*Gaillard's Medical Journal*, January, 1880).

Morbid growths of the larynx and the operation of laryngectomy constitute the remaining portions of this treatise that need be mentioned here. Naturally considerable prominence is given to those measures of attacking intralaryngeal growths that may be done through the mouth by laryngoscopic guidance. We confess to the feeling that a great deal of this sort of thing that is done by specialists, with their bit-by-bit methods, would be a great deal better done, from the standpoint of the patient's good at least, if direct access by external incision were more frequently resorted to.

L. S. PILCHER.

Article XI. INJURIES OF THE CHEST. By EDWARD H. BENNETT, M.D., F.R.C.S.I., President of the Royal College of Surgeons in Ireland, &c.

Article XII. DISEASES OF THE BREAST. By THOMAS ANNANDALE, F.R.C.S.E., Regius Professor of Clinical Surgery in the University of Edinburgh, and Senior Surgeon to the Edinburgh Royal Infirmary.

XI. Omitting any description of the peculiar anatomical structure of the chest, Prof. Bennett begins with contusions, considering them as "limited to the thoracic parietes," and as "involving the thoracic viscera," under the latter head noting the injuries consequent upon fracture of the ribs, and dwelling more at length upon the rupture of viscera without fracture.

Passing lightly over superficial wounds of the chest, he discusses the more important subject of penetrating wounds, drawing particular attention to the difficulty of diagnosis in these cases.

Hæmorrhage in injuries of the chest is treated somewhat at length, whether from the heart or great vessels, the phrenic or the smaller vessels of the lung, the intercostal or the internal mammary. He enumerates many of the numerous methods devised for treating hæmorrhage from the latter vessels, concluding by asserting that an attempt should

always be made to secure the vessel in the wound—if necessary by removal of bone or cartilage. In case the lung is suspected to have been involved, he strongly reprobates the tendency to probe the wound. Reviewing, with disapproval, the obsolete practice of free venesection in these cases, he advises rest, with cold to the surface, and opium. He omits any reference to the treatment of injuries of the heart and pericardium. The article, as a whole, is a valuable, comprehensive and well-developed study.

XII. In this article affections of the breast are considered under eleven heads, which comprehend, pretty fully, all the affections which demand the attention of the surgeon, beginning with congenital peculiarities of the breast, and including all benign and malignant growths, inflammatory and specific conditions. Tumors of the breast naturally occupies much of the article. He classifies the subject into simple and malignant, justifying this division by the still imperfect connection between the pathological and clinical aspects of these neoplasms. The clinical phase of his subject occupies his attention almost entirely. It would seem to have been an improvement had he given more space to pathological details, properly assisted by illustrations. This lack of illustrations is, we believe, a great blemish upon a very excellent memoir. In a work of this character, which is intended—and doubtless it will—to be the sole source of surgical information on many practitioners' book-shelves, nothing should be neglected which might add to the lucidity and intelligibility of the subject matter.

JAMES E. PILCHER.

Article XIII. INJURIES AND DISEASES OF THE ABDOMEN. By HENRY MORRIS, M.A. and M. B. Lond., F.R.C.S., Eng., Surgeon to, and Lecturer on Surgery at, the Middlesex Hospital, London.

This article is, by far, the longest in the volume, covering more than 260 pages, although it does not include the consideration of ovarian cysts, fibro-myomata of the uterus, or the operations of Porro, Müller, Freund, and Battey, all of which are to be treated in their appropriate chapters. The other injuries and diseases of the parietes and contents of the abdomen are very fully considered, and in a style which is clear and pleasing, and occasionally marked by a happiness of expression which serves to fix an important principle more firmly than would a page of commonplace. The various subjects are illustrated by a record of striking cases gathered from numerous sources, though it is noticeable that but few quotations are made from German writers—a fact which is less regrettable, as there is no lack of exemplification of topics

by cases from other sources. The author's own experience enriches the article to a notable extent, and the great opportunities afforded by the hospital in which he is both practitioner and lecturer, have been utilized with excellent discretion. The chapter, therefore, is by no means merely a compilation, but shows abundant evidences of being the work of an able, original, and experienced surgeon. His formulation of certain maxims is strong and positive, as where, in treating of penetrating wounds of the abdomen, with injury to the viscera, he says: "Probing and dilatation of the wound, except as part of some definite operation, cannot be too strongly condemned."

In the description of hypogastric lithotomy no mention is made of the method of lifting the full bladder into easy reach by distending the rectum with a rubber bag filled with water; but this is the only important omission we have noticed in our reading of the chapter.

F. H. GERRISH.

Article XIV. *HERNIA*. By JOHN WOOD, F.R.S., F.R.C.S., Professor of Clinical Surgery in King's College, and Senior Surgeon to King's College Hospital, London.

The author has first given brief consideration to hernia in general, its frequency, which he places at one to twenty individuals, its causes and signs, then treats of reducible, irreducible and strangulated hernia. While this portion of the article contains little that can be called original, the subject is dealt with in a clear and concise manner, bearing the mark of one thoroughly familiar with the subject matter.

Under special forms of hernia the original variety next receives consideration, the anatomy of the region given, its coverings stated, the operation for strangulation, diagnosis when not strangulated, and finally its radical cure, are all treated of in the order given.

It is to a description of his own operations for the radical cure of hernia that the author has devoted the greater portion of the article; this he terms "the subcutaneous wire operation," and especially recommends it for reducible hernias occurring in "healthy children and young persons in whom truss-pressure has been found to make no progress towards closing up the aperture." In three hundred operations three deaths are recorded, all of which occurred in the first hundred, and the author believes it fair to estimate seventy-five per cent. as the proportion of cures obtained. Just how he can arrive at this conclusion upon the records given, is not quite clear. In view of the fact that the operation under consideration has been over twenty years before the profession, during which time it has repeatedly been pre-

sented by the author, we cannot but think strange that it has met with so little approval either at home or abroad. It appears to have been little used here, but operations similar in character have repeatedly been tried and abandoned. We do not doubt that the author has attained great skill in the performance of the operation, and would succeed where those less skillful might fail; allowing the truth of this it places relief, by this method, beyond the reach of the great majority of sufferers. What is needed in writings of this character, and in methods for the relief of these cases, is something practical and simple, that can be adopted and carried out by the rank and file of practitioners. It is worthy of note that in the table of successful cases given (none others are recorded), forty years is the most advanced age, while forty-five out of the fifty-six cases reported were not over twenty-five years of age, a number of them being under ten years. The question may well be asked, could not many of these cases, even the majority, have been cured by the use of a suitable truss, or by milder surgical means than that resorted to. While this operation may be used successfully by the author, or possibly by those who are called upon to perform it frequently, we cannot see that it is one that will ever be adopted by any great number of surgeons.

W. B. DEGARMO.

TRANSACTIONS OF THE ACADEMY OF MEDICINE IN IRELAND, VOL. II.
EDITED BY WILLIAM THOMSON, M.A., F.R.C.S.

The Transactions of the Academy of Medicine in Ireland, for 1884, forming the second volume of the series, which has been published, contains some admirable papers, and is especially well worthy of perusal by surgeons. In the first place there are three excellent papers upon the subject of the Radical Cure of Hernia, contributed respectively by William Stokes, John K. Barton, and Kendal Franks. The large number of ruptured persons who presented themselves at the Richmond Hospital allows of an exceptional opportunity for meeting with suitable cases for operation. Mr. Stokes and his colleagues have of late adopted the following procedure in the treatment of the cases: "It consists in the insertion through the opened neck of the sac, and close up to the external abdominal rings of a deeply inserted carbolised catgut suture or sutures, according to the size, width, and depth of the neck; and this is followed by the approximation or closure of the canal and pillars of the rings by the insertion of two or more sutures of a stronger and more durable material, such as chromicised catgut, carbolized silk, or silver wire. It is, in fact, a dual system of sutures, one being peritoneal and the other inter-columnar."

Antiseptic precautions must be rigidly observed. Mr. J. K. Barton believes that Gross' operation fulfills every essential condition, and is at once more simple and sure than the subcutaneous operation of Wood. Mr. Barton, in the cases upon which he has operated, has modified in one small detail the procedure followed by Gross,—instead of refreshing the edges of the opening of descent preparatory to inserting the sutures, as Gross suggested, he simply draws them into close contact by strong silver wire. The wire was removed in only one of his cases, and he believes that, as a rule, it may be left in with decided advantage.

Mr. Kendal Franks, who contributes the third paper, discusses the question of operative procedure in these cases from two standpoints, namely: First, suture of the abdominal openings, without removal or ligature of the sac. Secondly, suture of the abdominal openings, after excision of the sac. He points out the utility of the former method in cases of recent reducible inguinal hernia where the sac has not had time to become large and thickened. After dissecting down to the sac, and returning it when this course seems desirable, the method of applying the sutures is thus described: A strong curved needle, fixed in a handle and armed with strong silver wire, is made to pass through the inner pillar of the external ring, near its apex, and at least half an inch from its free margin. It is then made to transfix the inner border of the internal ring, so as to reach the tip of the finger which lies in the canal. The point of the needle is then made to follow the tip of the finger, which is slowly withdrawn until the eye can be seen, and the wire caught with forceps. The needle is then withdrawn. It is now passed in a similar manner through Poupart's ligament and the external margin of the internal ring, at a point corresponding to its first point of entrance on the inner side. This time the needle is unarmed, and as soon as the eye is brought sufficiently far into the canal it is threaded with the free end of the wire which has already passed through the tissues on the other side of the rings. It is now withdrawn. One or two more sutures can then be passed in the same way lower down. The last one need only pass through the pillars of the external ring. By drawing the corresponding ends of the wire firmly together, the internal and external rings are approximated, the rings themselves closed and the canal obliterated. The second method of operating is applicable to cases of congenital hernia in which the sac consists of the patent tube of peritoneum, carried down originally by the descent of the testicle: also in old scrotal hernia, where the sac has contracted adhesions to the testicle, and the tissues of the spermatic cord are found to be adherent to the posterior wall of the sac throughout its length.

In cases of irreducible congenital scrotal hernia, it may become necessary, in order to complete the operation for the radical cure, to perform castration—and the removal of the testis is recommended in any case in a man advanced in years, in whom the organ is atrophied or undeveloped, inasmuch as this procedure tends to diminish the difficulties of the operation for the radical cure, and, as Mr. Franks maintains, is apt to lead to more efficiency in the cure. In the congenital hernia of children, of course, castration cannot be considered, and in these cases Buchanan, of Glasgow, has adopted a method which he suggested in 1879, which has the advantage of preserving the organ intact.

There is an interesting paper by Mr. Lambert H. Ormsby, upon acute traumatic malignancy, in which four cases are described, the distinguishing features of which are the rapid manifestation of malignant disease after the receipt of an injury. It is necessary to account for this by supposing the existence of a tumour—forming diathesis in each patient—as suggested by the author.

Mr. Coppinger discusses the question of fracture of the patella and its treatment by Lister's plan of wiring the fragments, but he considers it a feat which no ordinary surgeon should attempt without fully weighing the dangers to which he exposes his patients and his own reputation.

"Cases of Pharyngotomy," by Mr. W. I. Wheeler, forms a useful contribution upon this subject, the author believing that this operation, of which a good description is given, if dexterously performed, is not a fatal one.

Other practical and useful papers are contributed by Mr. W. Thornley Stokes, "On the removal of Naso-Pharyngeal Tumours." Sir George Porter, on foreign bodies in the knee joint. Mr. William Thomson on a case of pistol shot wound of the cerebellum. This review has reference, of course, only to the papers in the surgical section, but there are many excellent contributions in the medical, obstetrical and pathological sections in addition, which do not require notice here. Altogether the volume is an extremely good one in many ways, containing much that is original, interesting, and useful for reference, and the Academy of Medicine in Ireland may be congratulated upon the selection of papers which appears in the second volume of their transactions.

H. PERCY DUNN.

DIE MYOMOTOMIE dargestellt an 100 in Königlichen Universitäts-Frauenklinik zu Berlin ausgeführten Operationen. VON M. HOFMEIER, Secundärarzt der Kgl. Universitäts-Frauenklinik, Docent für Gynäkologie an der Universität Berlin. Mit 28 in den Text gedruckten

Holzschnitten. Stuttgart. Verlag von Ferdinand Enke, 1884, 8vo. pp. 1-112.

This is by far the most important monograph upon this subject which has yet appeared. Although long series of laparotomies have been recently reported by English surgeons, it is evident that they do not look with favor upon the operative treatment of uterine fibroids. Even Mr. Keith, who has had such success in this department, has confined himself almost entirely to hysterectomy, so that we may rightly credit the Germans with the operation of myomotomy proper, or enucleation of tumors from the uterine wall. The book must be regarded as the direct exposition of Professor Schröder's ideas, as it represents the result of his work. The number of cases is so large that the author's deductions can hardly fail to be valuable.

The *brochure* opens with an introductory sketch, in which the operative treatment of uterine fibroids is traced from the year 1843 to the present time. Attention is called to the fact that it is only a little over thirty years since the abdomen was first opened by Kimball, with the avowed intention of interfering with a uterine tumor. Péan's method of operating by *morcellement*, or removal of the growth piecemeal, by means of the *écraseur*, became generally popular after the publication of his monograph, so that up to the year 1877 eighty-six operations were performed in this manner, with a mortality of fifty per cent.

The substitution of the elastic ligature for *écraseur*, first suggested by Kleberg in 1879, was an important advance in the technique. The original idea was to transfix the cervix and to carry the ligature through it, but Hegar and Schröder simplified the matter by encircling the pedicle, the former favoring the extra-peritoneal method, while the latter surgeon has preferred the intra-peritoneal. The author quotes Dr. Bigelow's statistics with reference to the results of operations for myomotomy up to 1884, the total being 573, with a mortality of about forty-six per cent. He adds a table of 371 operations, performed by English and German surgeons from the year 1878 to the year 1884, the mortality of which is thirty-five per cent. The history of the different methods of treating the stump is next reviewed. Attention is called to the fact that Dr. Kimball, who performed the first laparo-myomotomy, was also the first to treat the pedicle intra-peritoneally. Since that time there has been a wide difference of opinion among operators as to which was the wiser course, some urging the inconvenience of the extra-peritoneal method, as well as the danger from traction, and from incomplete closure of the abdominal wound, while others have held that there was far more danger in returning to the peritoneal cavity a mass of tissue which could easily give rise to secondary hæmorrhage, or be-

come a formidable sloughing surface. To avoid the latter complication, the opposite edges of the stump were sewed together. But, continues the writer, the danger of hæmorrhage still remained, and in order to avoid it the écraseur was frequently drawn so tightly that the entire stump became gangrenous. Professor Schröder overcame this difficulty by tying the vessels separately, the blood-supply being temporarily controlled by means of the elastic ligature.

Dr. Hoffmeier devotes a few pages to the subject of diagnosis. In no case, he remarks, does a patient of Schröder undergo an operation until she has been carefully examined under ether, both by the vaginal and rectal touch, the cervix uteri being grasped by forceps and the whole organ drawn down as far as is consistent with safety. Even after the most conscientious investigation, the writer admits that it is often impossible to make an accurate diagnosis. As regards the indication for a radical operation, it is stated in general that fibroid tumors seldom threaten directly the life of the individual; active interference may, however, be necessary on account of the rapid growth of the tumor, with resulting pressure-symptoms, profuse hæmorrhages, ascites, when clearly due to the presence of this mass, and lastly pain, with or without other conditions. "Every case," he says very judiciously, "must be investigated *per se*, in order to determine whether the danger of the operation is proportioned to the urgency of the symptoms." In referring to the growth of fibro-myomata he takes occasion to refute the dictum of Hager; that these cease to enlarge after the beginning of the menopause. Several cases are mentioned in which tumors continued to grow in size after the cessation of menstruation, so that it was necessary to remove them. Such facts form a strong argument against "Hegar's operations."

Pages 19-41 are devoted to a description of the intra-peritoneal method of treating the pedicle. The following is a brief synopsis of Schröder's method of operating: The spray is used, carbolic acid being the favorite antiseptic. A free incision is made through the abdominal wall, so that the tumor can be at once lifted out of the cavity. The author rightly observes that there is less danger in enlarging an incision a few inches than in trying to remove a tumor piecemeal through a small opening. The edges of the wound are held closely together around the base of the growth. The most common adhesions are the omental; these may sometimes be diagnosticated before operation in thin subjects. The intestinal adhesions are the most serious; in these cases it is often advisable to separate a portion of the peritoneal covering of the tumor with the adherent gut, and to subsequently bring the opposite edges of the detached piece together with fine su-

tures, so that no raw surface is exposed. If the growth is situated at the fundus uteri, its base is constricted by a rubber cord, the mass is removed above the ligature, the opposite sides of the stump are approximated by deep sutures (a wedge-shaped piece being removed from the stump in order to facilitate this), and finally the peritoneum is brought together over the whole. Dr. Hofmeier affirms that the hæmorrhage in these cases can be controlled by the use of deep sutures, and that he has never seen a case in which it was impossible to check bleeding; a second class of cases are those in which the growth is more extensive, and lies below the level of the uterine appendages. The spermatic vessels are first tied in two places *en masse*, and are divided, the broad ligament is separated from the growth, bleeding vessels being tied as they appear; lastly, the round ligaments are divided between ligatures, whereupon it is possible to encircle the cervix with an elastic cord. The peritoneum is detached all around the tumor, at a point just above the ligature, and the uterine arteries are sought for and tied; they are usually found without difficulty. The tumor is now removed, the uterine cavity generally being opened during the process. Having been thoroughly disinfected, the cavity is closed by silk or catgut sutures, inserted deeply, and the wound is covered with peritoneum, as in the previous case. There is but little hæmorrhage after removal of the constriction. The abdominal wound is sutured with silk, an iodoform dressing is applied, and over this an ice-bag. Union is perfect on the tenth day.

The manner of treating the ovaries is discussed at some length, the author regarding the question of their removal as a comparatively unimportant one, even in the case of women who have not reached the menopause. If interference with the uterine appendages would prolong or complicate a difficult operation, he disapproves of it. The subject, he adds, is of more theoretical than practical value.¹

A third variety of the operations is now considered, supra-vaginal amputation of the uterus. This is a very different procedure from the others, since the cavity of the uterus is freely opened, and there is every opportunity for septic absorption. The advantage of the elastic ligature, in this connection, is proved by the fact that after Schröder began to use it his mortality was reduced from forty-five to twenty-two per cent. "These numbers speak for themselves." The value of the ligature lies in the freedom from hæmorrhage, the possibility of trimming down the mass to proper proportions, and the fact that, after

¹NOTE.—The writer is not very clear in his remarks concerning removal of the ovaries. He states in another place that when the operation was performed on account of hæmorrhage the ovaries were "generally extirpated at the same time."

removal of the temporary constriction, the stump receives such a blood-supply as to prevent it from becoming necrotic. A number of illustrative cases follow, several of which are accompanied by very good figures.

Under the head of "myotomies with enucleation," the fourth and last class of cases is described. This includes "those cases of myomata in which the tumors are interstitial and have involved the cervix to such an extent that it appears impossible either to surround the mass with a constricting cord or to form a useful stump from the tissue which would remain." In other words it comprises those cases in which an operation was formerly regarded as impossible, and where the prognosis is still very doubtful. Such growths should not be interfered with except after mature deliberation, and in the presence of most urgent symptoms. The author shows how in these cases two methods of procedure are offered, either to remove as much of the growth as possible, and to bring the opposite edges of the stump together with deep sutures, covering the whole with peritoneum, or to amputate the uterus after removing the tumor. The former, he says, was the better operation (*die idealere operation*), because the uterus was preserved, but the other furnished a smaller and more manageable stump. Briesky favors the latter method in all of these formidable cases, but Dr. Hofmeier says that no general rule can be given. It depends entirely upon the ease with which the tumor can be enucleated after opening its capsule, the amount of hæmorrhage, and the size of the wound which is left. Of the four cases treated by enucleation, which are described and figured in this book, two died. A study of the illustrations will cause the reader to wonder how a single one could have survived.

Even those tumors which seem to be firmly adherent to the pelvic connective tissue may be shelled out by first dividing their peritoneal covering and then passing the hand down into the pelvis on both sides and separating the adhesions. The hæmorrhage is not excessive in these cases, he affirms, and it is nearly always possible to detach the mass enough to carry an elastic ligature beneath it. The bladder is generally greatly elongated and drawn up in front of the tumor, but it can be easily peeled off by incising the peritoneum at a point above the fundus vesicæ and working the fingers down behind it. A number of formidable cases operated upon by Professor Schræder are related and admirably illustrated. Brief as the records are, they are highly instructive, and are calculated to inspire the reader with a high admiration for the boldness and readiness of the distinguished German surgeon. Of the twenty-one patients in whose cases this desperate measure was resorted to, twelve died. "It can be but a small consolation to us,"

says the author, "if we observe that the prognosis for these, which are by far the most difficult cases is not much worse now than was seven years ago the prognosis of all varieties of the operation. We must search earnestly for the cause of these extremely unfavorable results, in order that we may eventually improve upon them."

Hæmorrhage is the least danger, according to Dr. Hofmeier, a conclusion with which all of his readers will not agree. The great peril lies in the extent of the wounded surface, which offers the most favorable indus for septic germs. In order to avoid the imprisonment in the cavity of the products of suppuration, Martin, in 1883, proposed drainage through the vagina. Of this plan Schröder disapproves, nor has he adopted it in any of his operations, since he believes that this is the very way in which to render the wound septic. Küster has recently advocated the extra-peritoneal treatment of the bed, or sac, of an interstitial tumor after enucleation. We have been surprised throughout the course of the book to read so little concerning hæmorrhage after myomotomy. We confess that the author touches very lightly upon this subject. How the bleeding from an immense ragged hole, such as must remain after the enucleation of an interstitial fibroid, can be controlled by "compression-instruments" or "deep continued sutures," we cannot see. Certainly these means have failed in the cases which have come under our observation.

After referring to three instances in which Schröder performed myomotomy successfully during pregnancy, the author reviews the ultimate results of all the operations, and the subsequent condition of the patients. In reply to the objection urged against the intra-peritoneal treatment of the pedicle, that it favors exudation within the cavity, he admits that such is the case, but affirms that the exuded fluid is rapidly absorbed, and, moreover, that the amount may be limited by sewing the edges of the stump together; of Martin's method of drainage through the vagina he disapproves, so far from the stump being fixed by inflammatory adhesions, he has, in most instances, found it to be freely movable.

The object aimed at in the operation was attained in the majority of cases; the relief from hæmorrhage was always marked. By analyzing the thirty-two fatal cases, we read that nineteen were ascribed to "local or general peritonitis;" the terms "acute sepsis," and "secondary infection," are also used in rather a confusing manner, and in another place the writer employs the expression "septic peritonitis," which Mr. Tait finds so objectionable. The practical point is that in many of these instances there was a direct communication between the peritoneal cavity and the vagina, through the open stump of the uterus. So

far from arguing in favor of free drainage and irrigation, Dr. Hofmeister thinks that the cervix should be hermetically sealed by the thorough use of the cautery.

There were three deaths from primary hæmorrhage (or "shock," as he prefers to call it), in patients who were greatly reduced at the time of the operation, two from secondary hæmorrhage (though not from the wound (?)), one from tetanus, three from unknown causes, and four from heart-failure. In connection with the latter, attention is called to the interesting fact that brown atrophy of the heart is a common condition in patients with abdominal tumors, and may account for cases of sudden death which occur before and during operations for the removal of these growths.

In reviewing this table the writer observes that "every one must admit that a large number of these [results] could not possibly have been foreseen by the operator." Twelve of the fatal cases belong to the class which he had previously characterized as the most desperate. Referring to Kœberlé's communication to the recent International Congress, that he had operated upon fifty myomata by the extra-peritoneal method, with a mortality of "from five to ten per cent.," and to Keith's twenty-five cases with two deaths, he raises the objection that the character of the operations was not clearly stated.

Comparing Schröder's mortality of 22.5 per cent. in supra-vaginal amputations, with Hegar's 12.5 per cent., and Kalténbach's 14.3 per cent., he still dissents with these gentlemen who argue against the practice of returning the stump to the cavity. In discussing the prognosis of myomotomy he believes that in the simpler cases it is as good as in ovariectomy, the mortality being about five per cent.; when the uterine cavity is opened this rises to fifteen, and in the formidable cases of "extensive enucleation," it reaches fifty-seven per cent.

The author's closing words show that he is quite conservative in his views. Myomotomy, in his opinion, can only retain "the legitimate place which it has to-day acquired in operative gynecology," when the surgeon learns to exercise the utmost care in the selection of his cases, and in perfecting the details of the operation.

We have given but a brief resumé of the most important points in the monograph. It is not fair to criticise such a brief work from a literary point of view. Suffice it to say that the author's style is clear and his material well arranged. His deductions are not always scientific, nor does he avoid the pardonable fault of endeavoring to make the best of his statistics. Whatever impressions the reader may derive with regard to the value of the intra-peritoneal method of treating the pedicle, he cannot but admit that Dr. Hofmeister has presented some plausible arguments in its favor.

H. C. COE.

INDEX.

ABDOMEN, Gunshot wounds of, 184.
 — Injuries and diseases of, 588.
 Abdominal section, Observations in, 182.
 Abdominal surgery, Contributions to, 362.
 Abscess, Peri-uterine, Laparotomy for, 393.
 — Urinary, 373.
 Abscesses of hip disease, 494.
 Academy of Medicine in Ireland, Transactions of, 590.
 Air embolism, 517.
 Air passages, Injuries and diseases of, 585.
 ALEXANDER, W., Cure of some uterine displacements by shortening the round ligaments, 426.
 AMIDON, R. W., Statistical contribution to cerebral surgery, 197.
 Anæsthetic properties of Dimethyl acetale, 571.
 Aneurism, Cirroid, of dorsum of foot, 369.
 — Diffuse, of external iliac artery, 483.
 — High innominate, 582.
 — Inquiry into the use of the ligature in treatment, 13.
 — Right subclavian artery, 171.
 — Traumatic, 476, 477.
 Annandale, T., Diseases of breast, Review, 588.
 Annus Chirurgicus—1884, 30.
 Anterior tibial artery, Wounds of, complicating fract. of leg, 7.
 Astragalus, Fracture with dislocation, 490.
 Axillary artery, Rupture of, 478.

BENNETT, E. H., Injuries of the chest, Review, 587.
 — Mechanism of Fractures of clavicle, 293.
 Bladder, Opened by abscess from hip joint, 373.
 — Partial resection of wall of, 74.
 — Rupture of, Laparotomy, Suture, 67.
 — Tumors of, Cystotomy, 66, 372.

Bloodvessels, Wounded, Auscultatory symptoms of, 476, 477.
 — Cicatrization in, after ligature, 567.
 Bone, Conditions which predispose to tuberculosis of, 466.
 Brain, Extraction of pistol ball from, through counter opening in skull, 573.
 Branchial cysts of the neck, 91.
 Breast, Diseases of, 588.
 — Male, Neoplasms of, 71.
 BROWNING, W., Recent contributions to the surgery of the nerves, 132.
 — Review of Kümmell on forest wool as an antiseptic dressing material, 194.
 — Review of Neuber on Drainage, 87.
 Bryant, T., Mode of death from intestinal obstruction, 177.
 Buck, A. H., Injuries and diseases of the ear, Review, 385.
 Bull, W. T., Excision of tarsus, 271.
 — Gunshot wound of intestines, 479.
 — Rupture of bladder, 67.
 BURNETT, J., Sponge grafting, 550.
 BUTLER, G. R., Review of Post On the Face, 389.
 — Of Heath on the Mouth, 390.

CACHEXIA Strumipriva, 72, 276.
 Cæsarian section, 496.
 Calculus impacted in ureter, 77.
 Calvarium, Defect of, from injury, 73.
 Cancer of testicle in infants, 482.
 Cancerous deposits, secondary, from inoculation, 481.
 Caput obstipum, 580.
 Caries from otitis media, Operative treatment of, 580.
 Cerebral surgery, Statistical contribution to, 197.
 Cervical vertebræ, Luxation of, 75, 77.
 Charcot's disease, 256, 259.

- CHAVASSE, T. F., Review of Doran on Ovarian Tumors, 187.
 Chest, Injuries of, Review, 587.
 Cholecystotomy, 76, 362.
 Chromic acid, Local lesions caused by alkaline salts of, 303.
 Clavicle, Fractures of, mechanism, 293; treatment, 489.
 Clefts of jaw, lip, and face, 578.
 Club-foot, Tarsotomy in, 94.
 COE, H. C., Review of Hofmeister on myotomy, 592; of Koenig on tuberculosis of bones and joints, 284.
 Cohen, J. S., Injuries and diseases of air passages, Review, 585.
 Colotomy, 76, 78.
 Congress of French surgery, 292.
 CONNER, P. S., Review of Nancrede on injuries of head, 377; of Treves on malformations and diseases of head, 381.
 Copper, Salts of, Therapeutic use of, 275.
 Corrosive sublimate as a surgical dressing, 475.
 ——— Toxic enteritis caused by, 475.
 Cranium, Venous blood-tumors of, 324, 439.
 Cryptorchism, Complicated by torsion of cord, 74.

- DE GARMO, W. B., Review of Wood on Hernia, 589.
 DELAVERGNE, C. E., Review of Lefferts on the Nose, 387.
 Diatheses, Influence of traumatism upon, 273.
 Dimethyl acetale as an anæsthetic, 571.
 Diphtheria and Tracheotomy in Leipsic, 97.
 Dislocation of astragalus, 490; of cervical vertebrae, 75, 77; of hip, new method of reducing, 490; sacro-iliac, complicating fracture of femur, 463.
 Doran, A., Observations on ovarian tumors, Review, 187.
 Drainage of wounds, 60, 269; methods for dispensing with in the treatment of fresh wounds, 87.
 DUNN, H. P., Review of Trans. Acad. Med. Ireland, 590.

- Dwight, T., Frozen sections of a child, Review, 189.

- EAR, Injuries and diseases of, Review, 385.
 Echinococcus operations, 72.
 Ectrodactylia, 163.
 EDWARDS, F. S., Fatal case of attempted radical cure of hernia, 120.
 Encyclopædia of surgery, International, vol. v., Review, 377, 583.
 Epydidymitis, Gonorrheal, Treated with clay, 372.
 Epithelioma of tongue and floor of mouth, 280.
 Estlander's operation, 163.
 Exsection of bones in continuity preparatory to secondary suture of tendons and nerves, 484.
 Eyeball, Deaths following enucleation of, 575.
 Eyes and appendages, Injuries and diseases of, Review, 383.

- FACE, cheeks and lips, Injuries and diseases of, Review, 389.
 Facial nerve, Stretching of, 577.
 ——— Paralysis, Affections of hearing in, 279.
 Femoral artery and vein, Wound of, 167.
 FENGER, C., Chronic periuterine abscess, and its treatment by laparotomy, 393.
 FENWICK, H., Case of gastrotomy, 342.
 Fistulae, Nonurinary urethral, 374.
 Flatfoot, 494.
 FOWLER, G. R., Congenital sacral cysts, 115.
 ——— Early removal of caseous lymphatic gland, 566.
 Fracture, of astragalus, 490; of clavicle, 293, 489; of femur, extracapsular, 171; of humerus, epiphyseal, in the newborn, 492; of larynx, 280; of patella, 464; of patella, treated by wire suture, results, 491; of scapula, 491; of skull, 278; spontaneous, from osteoporosis, 65, 491.

- GALL bladder, Dropsy of, 362; operations upon, 76, 362.
 Gastrotomy, Fixation of stomach by hare-lip pins, 341.

- Gastrostomy, Successful case of, 342.
 Genu Valgum, Osteotomy for, 492.
 GERRISH, F. H., Review of Morris on the Abdomen, 588.
 Gerster, A. G., Extirpation of goitrous tumor, 65.
 GIBNEY, V. P., Review of Poore on Osteotomy and Osteoclasia, 192.
 Glands, Caseous lymphatic, early removal of, 566.
 ——— Mediastinal, Suppuration of, 361.
 ——— Surgery of scrofulous, 566.
 Gluteal artery, Rupture of, 477.
 Goitre, cystic, Treatment by iodine injections, 282.
 ——— Extirpation of, 65.
 ——— Present state of treatment of, 351.
 ——— Stenosis of trachea, 281.
 GOULD, A. P., Pneumotomy, 357.
 GRONER, F. J., Fracture of femur complicated with sacro-iliac dislocation, 463.
 Gross, S. D., Wounds of the intestines, 45.

HÆMATOCELE, Tunica vaginalis testis, 371.

- Hæmophilia, Cases of, 567.
 Hands, Deformity of, from cicatricial contraction, 64.
 Hare-lip, Operations for, 159.
 HARRISON, R., Treatment of stone in the bladder, 499.
 Head, Nancrede on injuries of, Review, 377.
 ——— Treves on malformations and diseases of, Review, 381.
 Hearing, Affections of, in traumatic facial paralysis, 279.
 Heath, C., Injuries and diseases of the mouth, etc., Review, 390.
 Henke's atlas of surgical anatomy, Review, 189.
 Hernia, Dangers of modern operative procedures for the radical cure of, 129.
 ——— Fatal case of attempt at radical cure, 120.
 ——— Wood on, Review, 589.
 Hip-disease, Management of abscesses of, 494.
 Hip-joint abscess opening into bladder, 373.

- Hip, New method of reducing dislocations of, 490.
 Hofmeier, M., Die Myotomie, Review, 592.
 HUTCHINSON, J., Peculiar form of fibrous tumor, 423.
 Hydatid tumors of omentum, 362.
 Hysterectomy, Vaginal, 75.

- I**NTERNAL carotid artery, Erosion of, with hæmorrhage from ext. aud. meat, 559.
 Intestinal obstruction, Cases of, 367.
 ——— Bryant on mode of death from, 177.
 Intestine, Internal strangulation of, 366.
 ——— Wounds of, 45, 46, 479.

- J**OINT-DISEASE, tuberculous, Treatment of, 488.
 Joints, Bacteria in metastatic inflammation of, 486.
 ——— Hereditary syphilitic disease of, 488.

- K**EEN, W. W., Combined tubular and capillary drainage of wounds, 269.
 KEETLEY, C. B., Dangers of modern operative measures for radical cure of hernia, 129; review of med.-chirurg. transact., 188; of Pye on surgical handicraft, 375; scraping out the marrow for osteo-myelitis, 1.
 Kidney, Extirpation of, Weir, 309.
 ——— Rupture of, Reeves on treatment of, 371.
 ——— Tuberculosis of, 369.
 Kingsley, N. W., Surgery of the teeth, Review, 391.
 Knee, Volkmann on arthrectomy of, 486.
 Koenig, Die Tuberculose der Knochen und Gelenke, Review, 284.
 Kümmell, Die Waldewolle als antiseptischen Verband-material, Review, 194.

- L**APARO-ELYTROLOGY, Successful case of, 25.
 Laparotomy for internal intestinal strangulation, 366.
 ——— for intestinal perforations, 161.
 ——— for periuterine abscess, 393.

Larynx, Extirpation of, for cancer, 74.
 — Fractures of, 280.
 Lefferts, G. M., Diseases and injuries of nose, review, 387.
 Lightning-stroke, Effects of, 160.
 Lithotomy, Antiseptic dressing for perineal, 373.
 — After-treatment of, 372.
 — Suprapubic, 159, 371.
 Little, J. L., on cystotomy for removal of tumors of the bladder, 66.
 Lower extremities, Surgical management of rhachitic deformities of, 492.
 Lymphangitis of upper limb, 368.
 Lymphoma, Malignant, cases of, 123.

MACLEOD, G. H. B., Injuries and diseases of neck, Review, 583.
 MACNAMARA, C., Fixation of stomach by hare-lip pins in gastrostomy, 341.
 MAY, B., Hæmorrhage from ext. aud. meat. by erosion of int. carotid artery, 559.
 Markoe, T. M., on capillary drainage, 60.
 Marrow, Osteogenetic power of, 484.
 MASTIN, W. M., Venous blood-tumors of cranium, 324, 439.
 MATHEWSON, A., Review of Williams on the Eye, 383; of Buck on the Ear, 385.
 Mediastinal glands, case of suppuration of, 361.
 Morris, H., Injuries and diseases of abdomen, Review, 588.
 Mouth, fauces, etc., Heath on Injuries and diseases of, Review, 390.
 Myotomy, Cases of, Stimson, 78; Review of Hofmeier on, 592.

NANCREDE, C. B., Review of Van Buren's Principles of Surgery, 79; on injuries of the head, Review, 377.
 Neck, Macleod on injuries and diseases of, Review, 583.
 Nephrectomy, 75, 159, 371.
 Nerve-stretching, 577.
 Nerves, cerebral, syphilitic affections of, 276.
 — Recent contributions to the surgery of, 132.

Neuralgia, trigeminal, Hutchison on operative results, 577.
 Neurectomy of infraorbital, 78, 345.
 Nose and its accessory sinuses, Review of Lefferts on, 387.

OESOPHAGUS, Malignant stricture of, 361.
 Omentum, Hydatid tumors of, 362.
 Osteo-myelitis, Treatment by scraping out the marrow, 1.
 Osteotomy of femur for genu valgum, 492.
 Ovariectomy, 162.

PARK, R. W., Tuberculous surgical affections, 233, 466.
 Parkes, C. T., Gunshot wounds of small intestines, 46.
 Patella, Coaptation fork for treating fracture of, 464.
 — Results of wire suture in treating fractures of, 491.
 Periorchitis hæmorrhagica, 371.
 PFARRE, J. A., on vulcanized rubber for handles to surgical instruments, 95.
 Pharyngotomy, subhyoid, 580.
 PILCHER, J. E., Review of Annandale on the Breast, 588; of Bennett on the Chest, 587.
 — Tracheotomy in laryngeal stenosis of tuberculous origin, 144.
 PILCHER, L. S., Case of simultaneous wound of femoral artery and vein, 167.
 — Cases of malignant lymphoma, 123.
 — Review of Cohen on Air-passages, 585; of Dwight's Frozen Sections of a Child, 189; of Henke's Surgical Anatomy, 189; of Kingsley on the Teeth, 391; of Senn on Branchial Cysts, 91; of Willard on Tarsotomy for Clubfoot, 94.
 Plastic operations, Maas on, 572.
 Plaster-of-Paris jackets, 78.
 Pneumotomy, 357.
 Poore, C. T., Osteotomy and osteoclasia, Review, 192.
 Post, A. C., Deformity of hands from cicatricial contractions, 64.
 — Injuries and diseases of face, etc., review, 389.

PYE, W., Local lesions caused by the alkaline salts of chromic acid, 303.
 ——— Surgical handicraft, Review, 375.
 Pylorus, Excision of, 77, 160.

RECTAL etherization, 570.

Rectum, Hæmorrhage from, Treatment of, 368.
 ——— Imperforate, Colotomy, 78.
 Rhachitic deformities of lower extremities, Surgical management of, 492.
 Rhinitis, chronic hypertrophic, 279.
 ROCKWELL, F. W., Neurectomy of infra-orbital nerve, 345.
 Rosinol and its therapeutic uses, 275.
 Round ligaments, Shortening for cure of uterine displacements, 426.
 Rubber, Vulcanized, for handles to surgical instruments, 95.

SACRAL cysts, congenital, 115.

Scalp, Fatal wound of, 277.
 Scapula, Old ununited fracture of, suture, cure, 491.
 Schuchardt, B., on neoplasms of the male breast, 71.
 SENN, N., Air-Embolism, 517.
 ——— Review of Macleod on the Neck, 583.
 SHEPHERD, F. J., Treatment of wounds of anter. tibial artery complicating comp. fracture of leg, 7.
 SKENE, A. J. C., Successful case of laparo-elytrotomy, 25.
 Skull, Fracture of, trephining, death, 278.
 Spermatic cord, Torsion of, complicating cryptorchism, 74.
 Sponge-grafting, 550.
 STIMSON, L. A., Inquiry into the use of the ligature in the treatment of aneurism, 13.
 ——— Fracture of patella, Coaptation fork for treating, 464.
 Stomach, Bullet wound of, 364.
 Stone in the bladder, Treatment of, 499.
 Surgical Handicraft, Pye, Review, 375.
 Sutton, R. S., Observations in abdominal section, 182.

Sutures, Buried, 73.
 Syphilis, Situation of initial lesion in males, 370.
 Syphilitic affections of cerebral nerves, 276.

TARSUS, Excision of entire, 271.

Teeth, Kingsley on surgery of, Review, 391.
 Tendo-vaginitis, Tuberculous, 564.
 Tenotomy of accessory tendons of ring finger in musicians, 185.
 Testicle, Tuberculosis of, 369.
 Thyroid tumors, Present state of treatment of, 351.
 Tongue, Epithelioma of, 280.
 Tonsils, Ignipuncture in hypertrophy of, 280.
 Trachea, Goitre-stenosis of, 281.
 Tracheotomy, 152, 580; after-treatment in, 581; in Leipsic, 97; in laryngeal stenosis of tuberculous origin, 144.
 Transactions, Medico-Chirurgical, 2d series, vol. 49, Review, 188.
 Treves, F., Malformations and diseases of the head, Review, 381.
 Tuberculosis of bones and joints, Review of Kœnig on, 284.
 ——— of genito-urinary tract, 369.
 ——— from the surgical stand-point, 273.
 Tuberculous surgical affections, 233, 466.
 ——— tendo-vaginitis, 564.
 Tumor, Cystic, of popliteal space, 483.
 ——— Peculiar form of fibrous, 423.

URETHRAL fistulæ, non-urinary, 374.

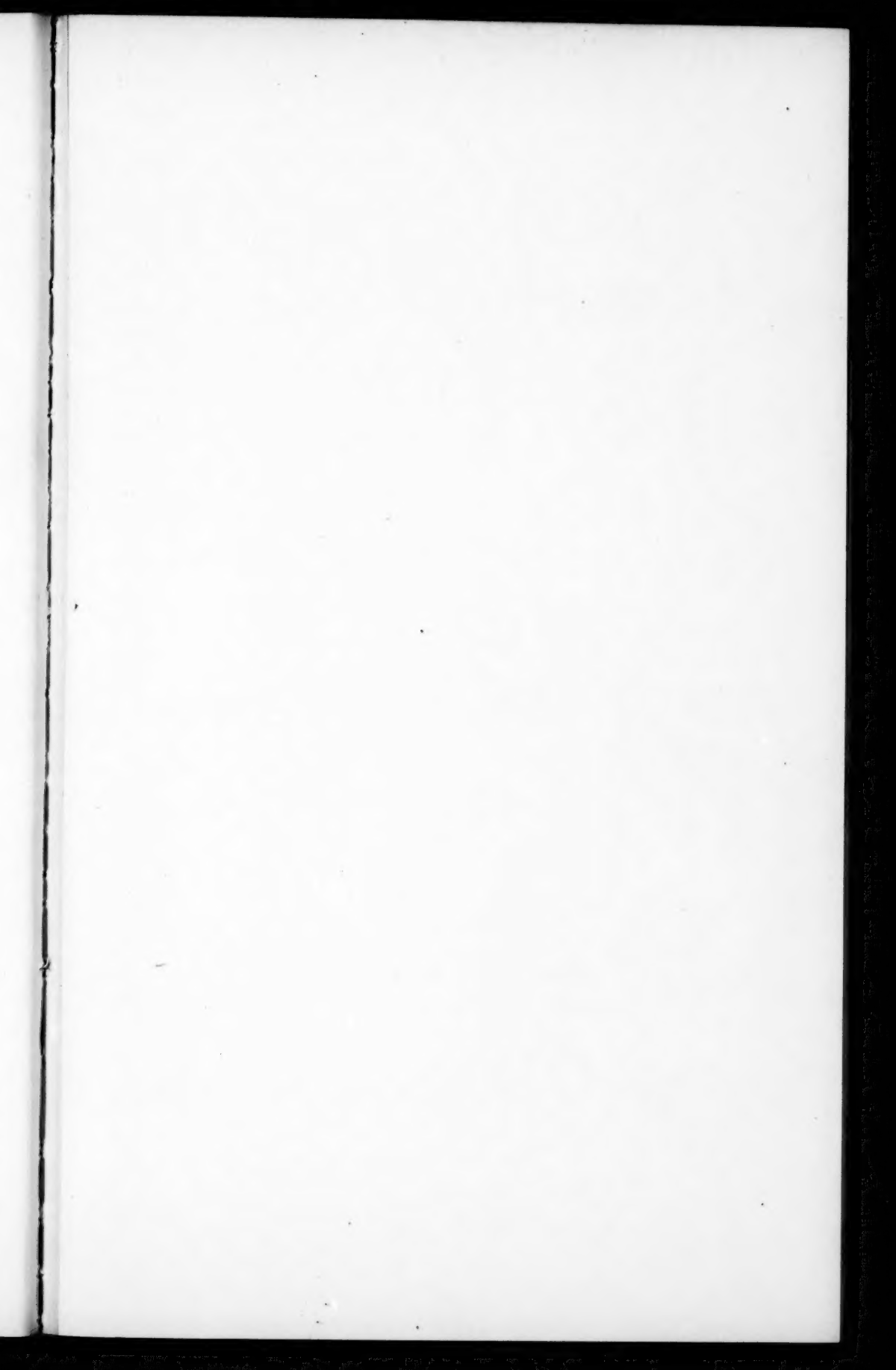
Urinary abscess, from extravasation, 373.

VAN ARSDALE, W. W., Diphtheria and tracheotomy in Leipsic, 97.

——— Present state of treatment of thyroid tumors, 351.
 Van Buren, W. H., Principles of Surgery, Review, 79.
 Veins, Rupture of, 478.

WATER, Hot, in surgery, 274; in the treatment of wounds, 475.

- WEIR, R. F., Extirpation of Kidney, 309.
- Williams, E., Injuries and diseases of the eyes and their appendages, Review, 383.
- Wood, J., Hernia, Review, 589.
- Wood-wool dressings for wounds, 71.
- Wound of scalp, Fatal, 277; of stomach, 364.
- Wounds of abdomen, 184; of intestines, 45, 46, 479.
- Treatment of by capillary drainage, 60.
- Wry-neck, 580.





VOL. L. NO. 6.

JUNE, 1886.

ANNALS OF SURGERY

A MONTHLY REVIEW
OF SURGICAL SCIENCE AND PRACTICE

EDITED BY

L. S. PILCHER, A.M., M.D., AND C. B. KEETLEY, F.R.C.S.

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For Contents, see Page 2 of Cover.

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CONTENTS FOR JUNE, 1885.

ORIGINAL MEMOIRS.

- I. Further Observations on the Treatment of Stone in the Bladder. (illustrations) *R. Harrison, F.R.C.S.* 499
- II. An Experimental and Clinical Study of St. Bartholomew *N. Senn, M.D.* 517
- III. Sponge Grafting *J. Bumpass, M.D.* 550
- IV. Hemorrhage from the External Auditory Meatus by Erosion of the Internal Carotid Artery; Ligature of Common Carotid; Recovery *A. May, F.R.C.S.* 559

INDEX OF SURGICAL PROGRESS.

GENERAL SURGERY.

- Baker*: Tuberculous Tendo-Vaginitis 564
- Traker*: The Surgery of Scrofulous Glands 566
- Fowler*: Caseous Lymphatic Glands and the Importance of their Early Removal 566
- Senn*: On Clottrization in Blood-vessels after Ligature 567
- Wagner*: Cases of Hemorrhoids 567
- Peters*: Rectal Etherization 570
- Flischer*: Dimethyl Acetate as an Anesthetic 571

OPERATIVE SURGERY.

- Meiss*: Plastic Operations by Fresh Prolongated Flaps from Distant Parts of the Body 573

HEAD AND NECK.

- Fluhrer*: Extraction of a Fistul Ball from the Orbit through a Counter-opening in the Skull 573
- Griffith*: Deaths following Excision of the Eyeball 575
- Wolfe*: Treatment of Detachment of the Retina 575
- Hutchison*: Results of Operative Treatment of two Cases of Trigeminal Neuralgia 577
- Kaufmann*: Stretching Facial Nerve 577
- Albright*: Morphological Significance of Claws of Jaw, Lips, and Face 578
- Pollockson*: Congenital Caput Obesum, and Open Section of Sternomastoid Muscle 580
- Loerman*: Subhyoid Pharyngotomy 580
- Schneider*: Operative Treatment of Swirls from Olfactory Mucosa 580
- Bernbaum*: Tracheotomy 580
- Passavant*: After-treatment in Tracheotomy 581
- Barnell*: Simultaneous Distal Ligature of Carotid and Subclavian Arteries for High Bifurcate Aneurism 584

REVIEWS OF BOOKS.

- I. The International Encyclopedia of Surgery. By JOHN AMBURN, JR., M.D. Vol. V. Articles IX-XIV. 583
- II. Transactions of the Academy of Medicine in Ireland. Vol. II. Edited by WILLIAM THOMSON, M.A., F.R.C.S. 590
- III. Die Myomatonie. Von Dr. H. HOFMEIER 592

Published Simultaneously in the United States and Great Britain.

PROSPECTUS ANNALS OF SURGERY

EDITED BY

L. S. PILCHER, A.M., M.D.,
4 MONROE STREET,
BROOKLYN, N. Y.

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